

# Prodigy Series Modular Cuber Technical Service Manual

**Models C0322, C0522, C0330, C0530, C0630,  
C0830, C1030, C1448, C1848 and C2148**



**also includes CB0522, CB0330, CB0530,  
CB0630, CB0830 and CB1030**

## Introduction

This technical manual covers the Prodigy line, excluding the Eclipse remote low side models. All models except Eclipse are shipped with an Installation and User's manual, which can be referred to separately. General installation information is included in this manual.

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## Model Number Description

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Example:

- C0530SA-1C
- C= cuber. CB = *Prodigy Advanced Sustainability Cuber*
- 05= nominal ice capacity in 100s of pounds
- 30= nominal width of cabinet. Other sizes are 22 and 48.
- S= Cube size. S=small or half dice cube. M=medium or full dice cube
- A=Condenser type. A=air cooled. W=water cooled. R = Remote
- -1=Electrical code. -1=115 volts. -32=208-230 single phase. -3=208-230 three phase.  
-6=230 50 Hz
- C=Series revision code. C=third series

Note: In some areas of this manual model numbers may include only the first five characters of the model number, meaning that the cube size, condenser type and voltage differences are not critical to the information listed there.

Scotsman reserves the right to make design changes and/or improvements at any time. Specifications and design are subject to change without notice.

## Water

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The quality of the water supplied to the ice machine will have an impact on the time between cleanings and ultimately on the life of the product. There are two ways water can contain impurities: in suspension or in solution. Suspended solids can be filtered out. In solution or dissolved solids cannot be filtered, they must be diluted or treated. Water filters are recommended to remove suspended solids. Some filters have treatment in them for suspended solids. Check with a water treatment service for a recommendation.

RO water. This machine can be supplied with Reverse Osmosis water, but the water conductivity must be no less than 10 microSiemens/cm.

### **Potential for Airborne Contamination**

Installing an ice machine near a source of yeast or similar material can result in the need for more frequent sanitation cleanings due to the tendency of these materials to contaminate the machine. Most water filters remove chlorine from the water supply to the machine which contributes to this situation. Testing has shown that using a filter that does not remove chlorine, such as the Scotsman Aqua Patrol, will greatly improve this situation, while the ice making process itself will remove the chlorine from the ice, resulting in no taste or odor impact. Additionally, devices intended to enhance ice machine sanitation, such as the Scotsman Aqua Bullet, can be placed in the machine to keep it cleaner between manual cleanings.

### **Water Purge**

Cube ice machines use more water than what ends up in the bin as ice. While most water is used during ice making, a portion is designed to be drained out every cycle to reduce the amount of hard water scale in the machine. That's known as water purge, and an effective purge can increase the time between needed water system cleaning.

In addition, this product has the capability to automatically vary the amount of water purged based on the purity of the water supplied to it. The water purge rate can also be set manually. Adjustments of purge due to local water conditions are not covered by warranty.

## General Installation - Air or Water Cooled

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### Location Limitations:

The product is designed to be installed indoors, in a controlled environment. Air cooled models discharge very warm air into the room out the back. Space must be allowed at the left side and back for air intake and discharge. Water cooled models discharge warm water into the building's drain. Space needs to be provided on both sides and above for service access.

### Space Limitations

Note: Although the machine will function, ice capacity of air cooled machines will be significantly reduced with minimal clearance at the sides, back and top. Some space is recommended for service and maintenance purposes on all models.

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6" of space at the sides and back are required for adequate operation. To get the most capacity, locate the machine away from heat producing appliances and heating ducts.

22 and 30 inch wide models: Airflow is in the left side, out the back (as viewed from the front).

48 inch wide models: Air flow is in the front and left side and out the back.

### Environmental Limitations

	Minimum	Maximum
Air temperature	50°F.	100°F.
Water temperature	40°F.	100°F.
Water pressure	20 psi	80 psi

### Power supply – acceptable voltage ranges

	Minimum	Maximum
115 volt model	104 volts	126 volts
208-230 volt model	198 volts	253 volts

### Warranty Information

The warranty statement for this product is provided separately from this manual. Refer to it for applicable coverage. In general warranty covers defects in material or workmanship. It does not cover maintenance, corrections to installations, or situations when the machine is operated in circumstances that exceed the limitations printed above.

## General Installation - Air or Water Cooled

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### Plumbing Requirements

All models require connection to cold, potable water. A hand actuated valve within site of the machine is required. Air cooled models have a single 3/8" FPT inlet water connection; a 3/8" FPT to 3/8" male flare adapter is supplied with the machine and can be used if desired.

Water cooled models have the same inlet fitting plus an additional 3/8" FPT condenser inlet water connection.

### Water Filters

If connecting to water filtration, filter only the water to the reservoir, not to the condenser. Install a new cartridge if the filters were used with a prior machine.

All models require drain tubing to be attached to them. Air cooled models have a single 3/4" FPT drain fitting in the back of the cabinet. Water cooled models have the same fitting plus an additional 1/2" FPT drain fitting in the back of the cabinet.

Install new tubing when replacing a prior ice machine, as the tubing will have been sized for the old model and might not be correct for this one.

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Note: This NSF listed model has a 1" anti-back flow air gap between the water inlet tube end and the highest possible reservoir water level, no back flow device is required for the potable water inlet.

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### Drain Tubing:

Use rigid drain tubes and route them separately – do **not** Tee into the bin's drain and, if water cooled, do **not** Tee the condenser drain into the reservoir or bin drain.

Vent the reservoir drain. A vertical vent at the back of the drain, extended about 8 – 10" will allow the gravity drain to empty and also keep any surges during draining from discharging water out the vent..

Horizontal runs of drain tubing need a 1/4" fall per foot of run for proper draining.

**Follow all applicable codes.**

## General Installation - Air or Water Cooled

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### Electrical

See the spec sheet or User's Manual for Minimum Circuit Ampacity or Maximum Fuse Size ratings.

The machine is not supplied with a power cord, one must either be field installed or the machine hard-wired.

The dataplate on the back of the cabinet details the power requirements, including voltage, phase, minimum circuit ampacity and maximum fuse size. HACR type circuit breakers may be used in place of fuses. Extension cords are not permitted. Use of a licensed electrician is recommended.

Electrical connections are made inside the junction box in the back panel of the ice machine.

**Follow all applicable local, state and national codes.**

# General Installation - Air or Water Cooled

## Adjustments

### Ice Bridge Thickness

Caution: Do not make the bridge too thin or the machine will not harvest properly. Bridge thickness adjustments are not covered by warranty.

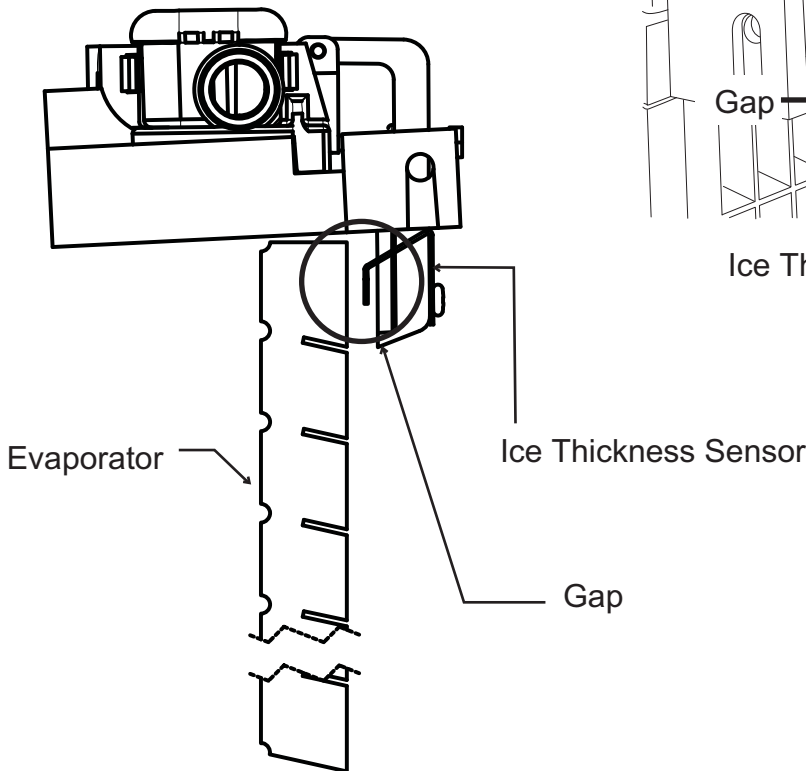
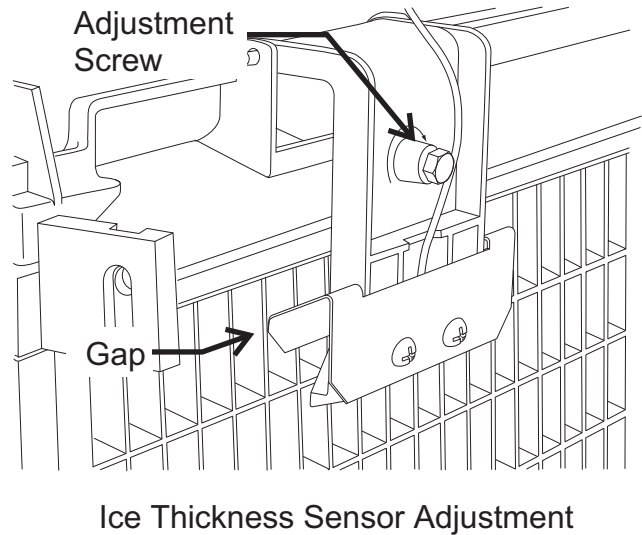
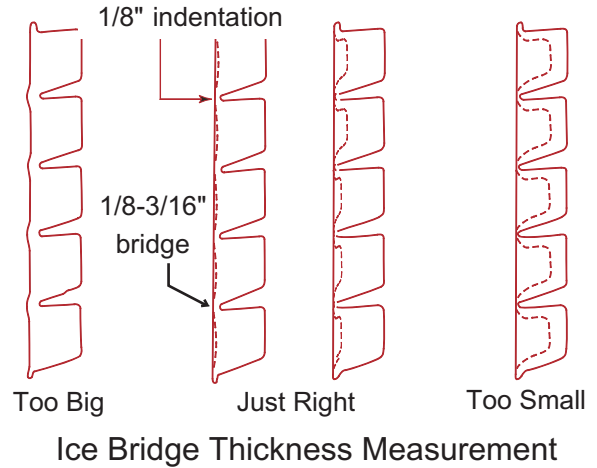
Shut machine off.

Access the ice thickness sensor.

Check gap between metal tip and evaporator grid. Small cube standard gap is  $3/16$  inch, medium cube standard gap is  $7/32$  inch. To set, place a  $3/16$ " (small cube) or  $7/32$ " (medium cube) drill bit between sensor tip and evaporator to check. Adjust gap using adjustment screw.

Restart unit and check ice bridge. Repeat as needed.

Note: Indentations may be deeper on C0322 and C0330



Side View of Evaporator and Ice Thickness Sensor



## Water purge setting

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The water purge is factory set to the Automatic setting. The setting can be changed to one of 5 manual settings or placed on automatic. The purge setting shows in the Code Display.

purge setting	1 - Minimum	2 - Moderate	3 - Standard	4 - Heavy	5 - Maximum	A - Automatic
Water Type	RO water or equivalent, TDS less than 35	Low TDS non - RO water	Setting for typical water	High TDS water	Very high TDS water, greater than 256	Any with conductivity not less than 10 microSiemens/cm

To set:

Switch the machine OFF by holding the Off button in until a number or the letter A shows on the display.

Press and release the On button repeatedly until the number on the display corresponds to the desired setting.

Press and release the Off switch again to return to the normal control state.

## General Installation - Remote

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### Location Limitations

This ice system is made up of three parts, the ice making machine, or head; the remote condenser; and the interconnecting tubing. The ice making machine must be installed indoors, in a controlled environment. Space must be provided near the machine for service access. The remote condenser may be installed above or below the ice machine, per the limits stated later in this manual. The remote condenser may be installed outdoors within the temperature limits listed below. The interconnecting tubing must be installed per the directions stated in this manual, and the amount of tubing exposed to uncontrolled temperatures must be minimized.

### Space Limitations

Although the machine will function with no clearance to the top and sides, some space must be allowed for service access. Building the machine in with no access will cause higher service cost, in many cases this extra cost may not be covered by warranty.

### Environmental Limitations, ice machine:

	Minimum	Maximum
Air temperature	50°F.	100°F.
Water temperature	40°F.	100°F.
Water Pressure	20 psi	80 psi

### Environmental Limitations, remote condenser

	Minimum	Maximum
Air temperature	-20°F.	120°F.

### Power Supply

	Minimum	Maximum
115 volt model	104 volts	126 volts
208-230 volt model	198 volts	253 volts

### Warranty Information

The warranty statement for this product is provided separately from this manual. Refer to it for applicable coverage. In general warranty covers defects in material and workmanship. It does not cover maintenance, corrections to installations, or situations when the ice machine is operated in circumstances that exceed the limitations printed above.

## General Installation - Remote

### Product Description and Electrical Requirements

- See spec sheet or User's Manual for Minimum Circuit Ampacity or Maximum Fuse Size

Dimensions w" x d" x h"	Model	Electrical	Use condenser
22 x 24 x 23	C0522SR-1	115/60/1	ERC111-1
same	same	same	ERC211-1**
30 x 24 x 23	C0530SR-1	115/60/1	ERC111-1
same	same	same	ERC211-1**
same	C0630SR-32	208-230/60/1	ERC311-32
30 x 24 x 29	C0830SR-32	208-230/60/1	ERC311-32
same	C0830SR-3	208-230/60/3	ERC311-32
same	C1030SR-32	208-230/60/1	ERC311-32
same	C1030SR-3	208-230/60/3	ERC311-32
48 x 24 x 29	C1448SR-32	208-230/60/1	ERC311-32
same	C1448SR-3	208-230/60/3	ERC311-32
same	C1848SR-32	208-230/60/1	ERC611-32
same	C1848SR-3	208-230/60/3	ERC611-32
same	C2148SR-32	208-230/60/1	ERC611-32
same	C2148SR-3	208-230/60/3	ERC611-32

\*\* ERC211 has two circuits, when two C0522s or C0530s are connected to it, fan motor relay kit KCMR120 must be used to control the fan motor.

Ratings include the remote condenser motor, as it is designed to be powered by the ice machine. If connecting remote condenser independently of the ice machine, use the information on the condenser's dataplate for fuse and wire sizes.

Table notes: Medium cube models have the same electrical characteristics as Small. Series revision code omitted. All the listed condensers include a headmaster valve.

## General Installation - Remote

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### Central Condenser Coils

The ice machine may be connected to a central condenser coil. The requirements are:

- Coil – not previously used with mineral oil system. Virgin coil preferred.
- Correct size (internal volume) and capacity (BTUH).
- Includes a headmaster valve for discharge pressure control. Headmaster kit available for certain MAC condensers, kit number is RCKCME6GX.
- Fan motor on all the time or controlled to be on whenever the ice machine is operating.
- Non-Scotsman condensers must have prior Scotsman Engineering approval for warranty coverage to be in effect.

### Precharged tubing kits:

The ice making head's and the remote condenser's refrigeration circuits must be connected. They are designed to be connected using precharged refrigerant tubing, supplied in kits of liquid and discharge tubes. Several lengths are available, order the one that just exceeds the length needed for the site.

10"	25'	40'	75'
RTE10	RTE25	RTE40	RTE75

No additional refrigerant is required. Note: Refrigerant charge is supplied with the ice machine.

## General Installation - Remote

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### Water

The quality of the water supplied to the ice machine will have an impact on the time between cleanings and ultimately on the life of the product. There are two ways water can contain impurities: in suspension or in solution. Suspended solids can be filtered out. In solution or dissolved solids cannot be filtered, they must be diluted or treated. Water filters are recommended to remove suspended solids. Some filters have treatment in them for suspended solids. Check with a water treatment service for a recommendation.

RO water. This machine can be supplied with Reverse Osmosis water, but the water conductivity must be no less than 10 microSiemens/cm.

### Potential for Airborne Contamination

Installing an ice machine near a source of yeast or similar material can result in the need for more frequent sanitation cleanings due to the tendency of these materials to contaminate the machine. Most water filters remove chlorine from the water supply to the machine which contributes to this situation. Testing has shown that using a filter that does not remove chlorine, such as the Scotsman Aqua Patrol, will greatly improve this situation, while the ice making process itself will remove the chlorine from the ice, resulting in no taste or odor impact. Additionally, devices intended to enhance ice machine sanitation, such as the Scotsman Aqua Bullet, can be placed in the machine to keep it cleaner between manual cleanings.

### Water purge

Cube ice machines use more water than what ends up in the bin as ice. While most water is used during ice making, a portion is designed to be drained out every cycle to reduce the amount of hard water scale in the machine. That's known as water purge, and an effective purge can increase the time between needed water system cleaning.

In addition, this product is designed to automatically vary the amount of water purged based on the purity of the water supplied to it. The water purge rate can also be set manually. Adjustments of purge due to local water conditions are not covered by warranty.

## General Installation - Remote

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### Remote Condenser Location

Use the following for planning the placement of the condenser relative to the ice machine - see illustration on the following page.

**Location Limits - condenser location must not exceed ANY of the following limits:**

- Maximum rise from the ice machine to the condenser is **35 physical feet**
- Maximum drop from the ice machine to the condenser is **15 physical feet**
- Physical line set maximum length is 100 feet.
- Calculated line set length maximum is 150.

#### Calculation Formula:

- Drop =  $dd \times 6.6$  (dd = distance in feet)
- Rise =  $rd \times 1.7$  (rd = distance in feet)
- Horizontal Run =  $hd \times 1$  (hd = distance in feet)
- Calculation: Drop(s) + Rise(s) + Horizontal Run =  $dd+rd+hd$  = Calculated Line Length

**Configurations that do NOT meet these requirements must receive prior written authorization from Scotsman.**

#### Do NOT:

- Route a line set that rises, then falls, then rises.
- Route a line set that falls, then rises, then falls.

#### Calculation Example 1:

The condenser is to be located 5 feet below the ice machine and then 20 feet away horizontally.

$5 \text{ feet} \times 6.6 = 33$ .  $33 + 20 = 53$ . This location would be acceptable

#### Calculation Example 2:

The condenser is to be located 35 feet above and then 100 feet away horizontally.  $35 \times 1.7 = 59.5$ .  $59.5 + 100 = 159.5$ . 159.5 is greater than the 150 maximum and is NOT acceptable.

**Operating a machine with an unacceptable configuration is misuse and will void the warranty.**

# General Installation - Remote

## For The Installer: Remote Condenser

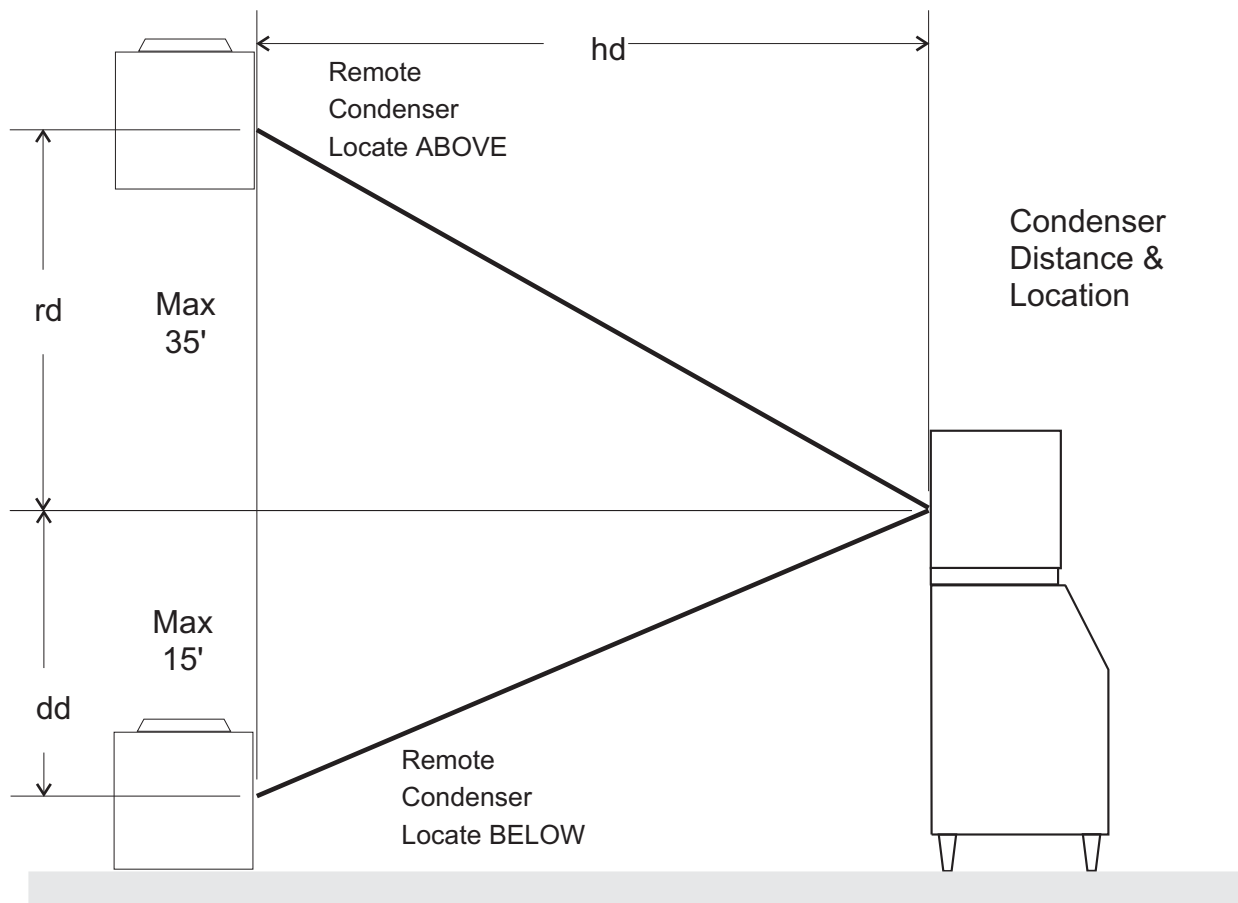
Locate the condenser as near as possible to the interior location of the ice machine.

Note: The location of the condenser is relative to the ice machine is LIMITED by the specification on the prior page.

**Meet all applicable building codes.**

### Roof Attachment

Install and attach the remote condenser to the roof of the building, using the methods and practices of construction that conform to the local building codes, including having a roofing contractor secure the condenser to the roof.



## General Installation - Remote

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### Precharged Line Routing

Do not connect the precharged tubing until all routing and forming of the tubing is complete. See the Coupling Instructions for final connections.

1. Each set of pre-charged tubing lines contains a 3/8" diameter liquid line, and a 1/2" diameter discharge line. Both ends of each line have quick connect couplings, the end without access valves goes to the ice maker.

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Note: The openings in the building ceiling or wall, listed in the next step, are the minimum sizes recommended for passing the refrigerant lines through.

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2. Have the roofing contractor cut a minimum hole for the refrigerant lines of 1 3/4". Check local codes, a separate hole may be required for the electrical power supply to the condenser.

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Caution: Do NOT kink the refrigerant tubing while routing it.

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3. Route the refrigerant tubes thru the roof opening. Follow straight line routing whenever possible. Excess tubing may EITHER be coiled up INSIDE the building OR cut out prior to connection to the ice maker and condenser.

If the excess tubing is cut out, after re-brazing the tubing must be evacuated prior to connection to the ice maker or condenser.

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Note brazing requires a nitrogen purge.

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If the excess tubing is to be coiled, spiral it horizontally to avoid excess trapping in the lines.

5. Have the roofing contractor seal the holes in the roof per local codes



# General Installation - Remote

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## Coupling Instructions

The couplings on the ends of the pre-charged line sets are self-sealing when installed properly. Follow these instructions carefully.

These steps must be performed by an EPA Certified Type II or higher technician.

### Initial Connections

1. Remove the protector caps and plugs. Wipe the seats and threaded surfaces with a clean cloth to remove any possible foreign matter.
2. Lubricate the inside of the couplings, especially the O-rings, with refrigerant oil.
3. Position the fittings on the correct connections on the condenser and ice machine.
  - The 1/2" discharge line (schrader valve end) goes to the remote condenser fitting marked "discharge line".
  - The 3/8" liquid line (schrader valve end) goes to the remote condenser fitting marked "liquid line".
  - The 1/2" discharge line goes to the ice maker fitting marked "discharge line".
  - The 3/8" liquid line goes to the ice maker fitting marked "liquid line".

### Final Connections:

4a. Begin by tightening the couplings together by hand until it is certain that the threads are properly engaged.

4b. Then using two wrenches tighten the coupling until it bottoms out or a definite increase in resistance is felt.

It is important that ONLY the nut on the pre-charged tube be turned, or the diaphragms will be torn out by the piercing knives and they will be loose in the refrigeration system. Note: As the couplings are tightened, the diaphragms in the quick connect couplings will begin to be pierced. As that happens, there will be some resistance to tightening the swivel nut.

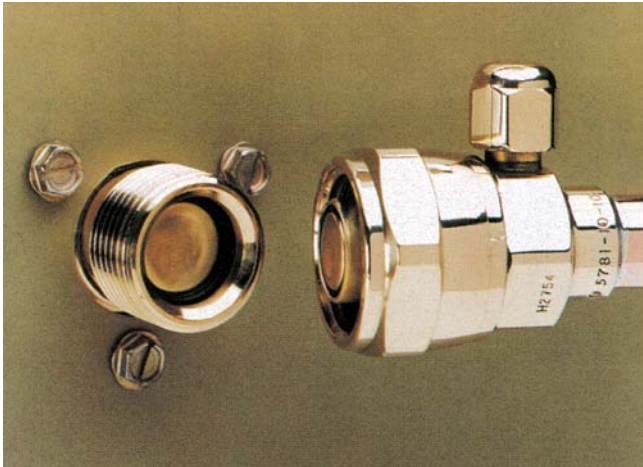
4c. Continue tightening the swivel nut until it bottoms out or a very definite increase in resistance is felt (no threads should be showing).

5. Use a marker or pen to mark a line on the coupling nut and unit panel. Then tighten the coupling nut an additional one-quarter turn. The line will show the amount that the nut turns. Do NOT over tighten.

6. After all connections have been made, and after the receiver valve has been opened (open at Initial Start Up), check the couplings for leaks.

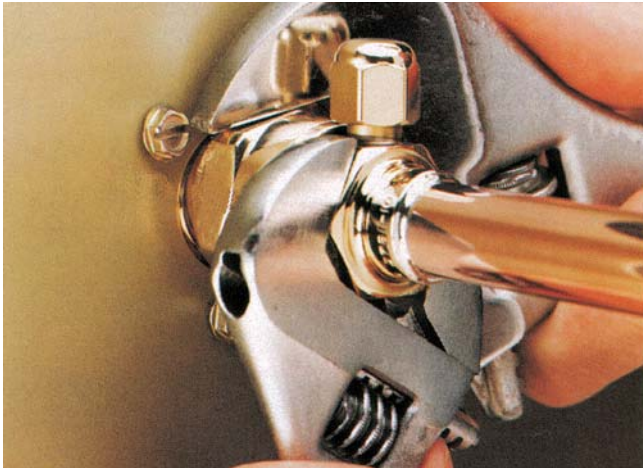
## Pre-Charged Tubing Coupling Connections

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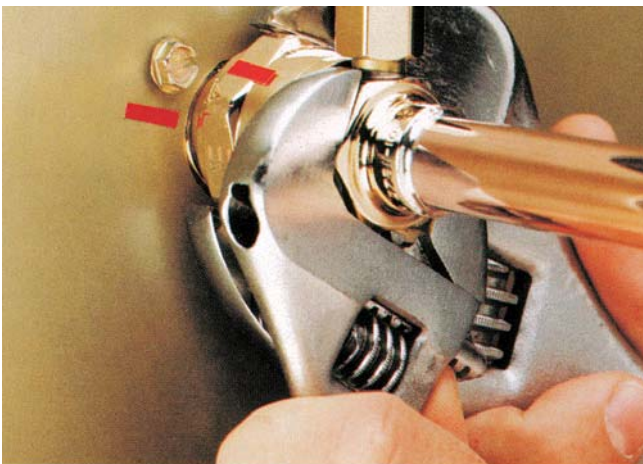
Inspect couplings, wipe clean and lubricate both parts with polyolester refrigerant oil.

Hand tighten to be sure threads are properly engaged.



Use two wrenches and continue tightening the couplings. As the diaphragms begin to pierce, the couplings will be harder to turn. Be sure only the swivel nut is rotated.

Continue tightening until the swivel nut feels like it is tight, then go to the next step. No threads will be seen when the couplings are tight.



After the swivel nut feels like it is tight, mark the nut and the panel. Then tighten one quarter turn more. That ensures that there is a brass-to-brass joint inside the coupling.

## General Installation - Remote

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### Plumbing Requirements

All models require connection to cold, potable water. A hand actuated valve within site of the machine is required. There is a single 3/8" FPT inlet water connection, a 3/8" FPT to 3/8" male flare adapter is supplied with the machine and can be used if desired.

#### Water Filters

Install a new cartridge if the filters were used with a prior machine.

All models require drain tubing to be attached to them. There is a single 3/4" FPT drain fitting in the back of the cabinet.

Install new tubing when replacing a prior ice machine, as the tubing will have been sized for the old model and might not be correct for this one.

Connect water supply to water inlet fitting.

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Note: This NSF listed model has a 1" anti-back flow air gap between the potable water inlet tube end and the highest possible reservoir water level, no back flow device is required.

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Connect drain tubing to drain fitting.

Route the drain tubing to building drain. Follow local codes for drain air gap.

Use rigid drain tubes and route them separately – do not Tee into the bin's drain.

Vent the reservoir drain. A vertical vent at the back of the drain, extended about 8 – 10" will allow the gravity drain to empty and also keep any surges during draining from discharging water.

Horizontal runs of drain tubing need a 1/4" per fall per foot of run for proper draining.

**Follow all applicable codes.**

## General Installation - Remote

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### Electrical

The machine is not supplied with a power cord, one must either be field installed or the machine hard-wired.

The dataplate on the back of the cabinet details the power requirements, including voltage, phase, minimum circuit ampacity and maximum fuse size. HACR type circuit breakers may be used in place of fuses. Extension cords are not permitted. Use of a licensed electrician is recommended.

The ice maker is designed to operate on its own electrical circuit and must be individually fused. Voltage variation must not exceed the limits listed earlier.

The remote condenser is designed to be powered from the ice machine. A separate knockout hole has been provided in the ice maker electrical junction box.

Electrical connections are made inside the junction box in the back panel of the ice machine.

Remove the junction box cover and route the power cord through the access hole and properly attach the power supply wires to the leads in the junction box.

Attach the remote condenser fan motor wires to the wires in the junction box tagged "fan motor leads".

Install field supplied strain reliefs per code. Attach a ground wire to the ground connection in the junction box.

Check voltage when complete.

Return the junction box cover to its original position and secure with the original screws.

Follow all applicable local, state and national codes.

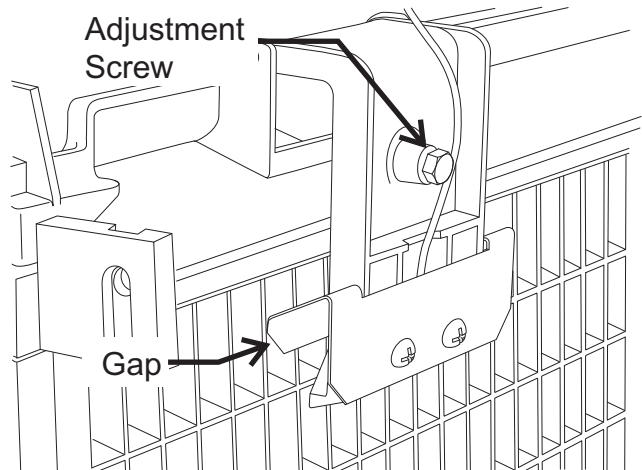
# Adjustments

## Bridge Thickness - For the Service Tech Only

Push and hold Off till the machine stops.

Access ice thickness sensor.

Check gap between metal tip and evaporator grid. Small cube standard gap is 3/16 inch, medium cube standard gap is 7/32 inch. To set, place a 3/16" (small cube) or 7/32" (medium cube) drill bit between sensor tip and evaporator to check. Adjust gap using adjustment screw.



Restart unit and check ice bridge. Repeat as needed

Caution: Do not make the bridge too thin or the machine will not harvest properly. Bridge thickness adjustments are not covered by warranty.

## Water purge setting

The water purge is factory set to Automatic. The setting can be changed to one of 5 manual settings or left on automatic.

purge setting	1 - Minimum	2 - Moderate	3 - Standard	4 - Heavy	5 - Maximum	A - Automatic
Water Type	RO water or equivalent, TDS less than 35	Low TDS non - RO water	Setting for typical water	High TDS water	Very hHigh TDS water, greater than 256	Any with conductivity not less than 10 microSiemens/cm

To set:

Switch the machine OFF by holding the Off button in until a number or the letter A shows on the display.

Press and release the On button repeatedly until the number on the display corresponds to the desired setting.

Press and release the Off switch again to return to the normal control state.

## Prodigy Cuber System Information

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### Overall System Type:

- **Refrigeration:** Mechanical, either air cooled, water cooled or remote cooled.
- **Water System:** Inlet water solenoid valve fills reservoir once per cycle. Purge solenoid valve opens to discharge some reservoir water once per cycle.
- **Control System:** Electronic
- **Harvest cycle sensor:** Conductivity probe
- **Water full/empty sensor:** Conductivity probe
- **Bin Control:** Curtain Switch
- **Ice type:** Unified
- **Harvest system:** Hot gas defrost with mechanical assist

### Electrical Components:

- Compressor
- Contactor
- Water Pump
- Inlet Water Solenoid Valve
- Purge or purge Valve
- Fan Motor(s)
- Fan motor pressure control
- High pressure cut out – certain AC models only
- Harvest Assist Solenoid(s)
- Hot Gas Valve(s)
- Controller
- Transformer – 12v AC for the controller only
- Water Level Sensor
- Ice Thickness Sensor
- Curtain Switch(es)

# Controller Information

## Machine Indicator Lights

- Power
- Status
- Water
- Clean

## Code Display

**Main codes** - automatically displayed

- F . . . . . Freeze Cycle
- F flashes . . Freeze Cycle is Pending
- H . . . . . Harvest Cycle
- H flashes . . Manual Harvest
- b . . . . . Bin is Full
- C . . . . . Clean Cycle
- L . . . . . Board Locked
- d . . . . . Test Mode
- O . . . . . Off
- E . . . . . Self Test Failed
- 1 flashes . . Max Freeze - Retrying
- 1 . . . . . Max Freeze Time Shut Down
- 2 flashes . . Max Harvest - Retrying
- 2 . . . . . Max Harvest Time Shut Down
- 3 . . . . . Slow Water Fill
- 4 . . . . . High Discharge Temp
- 5 . . . . . Sump Temp Sensor Failure
- 7 . . . . . Discharge Temp Sensor Failure
- 8 flashes . . Short Freeze - Retrying
- 8 . . . . . Short Freeze - Thin ice

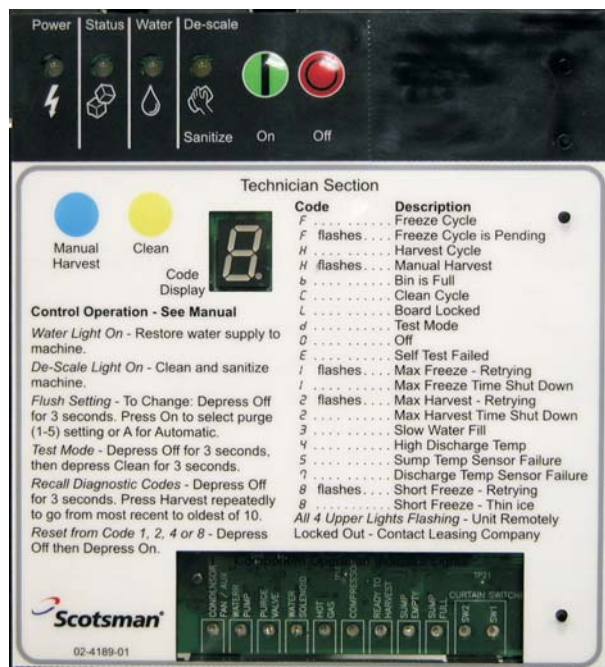
**Setting Codes** - requires push button sequence

Water Purge Settings

A, 1, 2, 3, 4, 5

De-Scale notification

- see table to the right



Change De-Scale Notification Interval - This feature is accessible only from standby (Status Light Off).

1. Press and hold harvest button for 3 seconds.

This starts the Time to Clean Adjustment Mode and displays the current time to clean setting.

2. Press the clean button repeatedly to cycle through the 4 settings:

Prior	Effective 11/6/08
3 months	1 year
4 months	0 or disabled
5 months	4 months
6 months (default)	6 months (default)

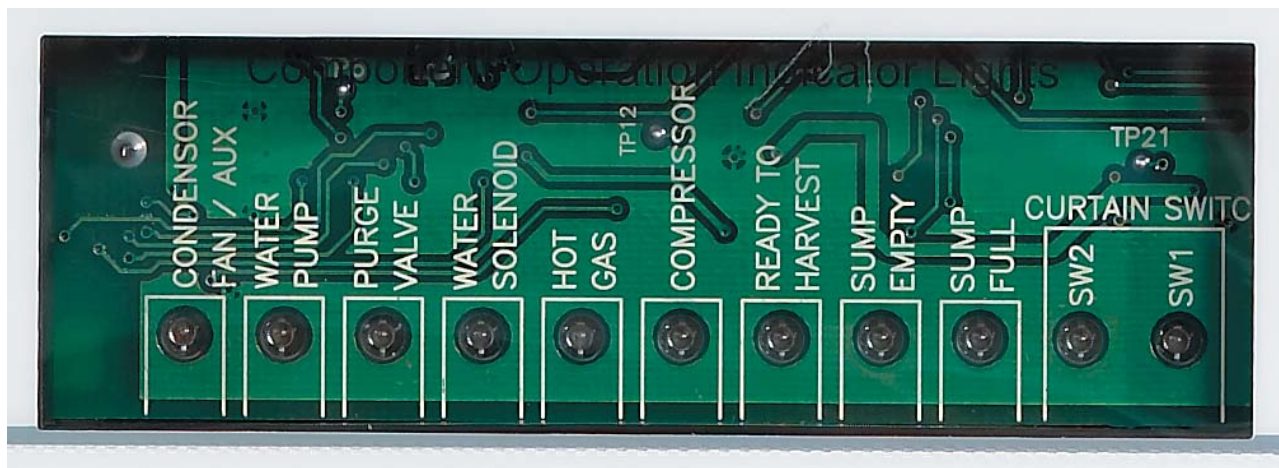
3. Push Off to confirm the selection.

## Controller Information

---

### Component Indicator Lights

- Condenser Fan / Aux (Aux = liquid line solenoid when a remote condenser model)
- Water Pump
- Purge Valve
- Water Solenoid
- Hot Gas
- Compressor
- Ready to Harvest
- Sump Empty
- Sump Full
- Curtain SW1
- Curtain SW2



Component Indicator Lights



## How It Works - Air Cooled

---

**Freeze Cycle.** At start up the controller drains and refills the reservoir. The reservoir refills when the mid length water level sensor probe is uncovered and continues to fill until the top probe is in contact with water. When the reservoir has filled, the compressor and water pump start. After the discharge pressure has increased past the cut in point of the fan pressure control, the fan motor(s) will begin to operate and warm air will be discharged out the back of the cabinet. The fan motor will switch on and off as the discharge pressure rises and falls. Water flows over the evaporator as the refrigeration system begins to remove heat. When the water temperature falls to a preset point, as measured by the water temperature sensor, the controller shuts off the water pump for 30 seconds. The freeze cycle resumes when the pump restarts and ice begins to form on the evaporator. As it forms, the water flowing over the ice moves closer and closer to the metal tip of the ice thickness sensor. When it comes into contact with the sensor for a few continuous seconds, that signals the controller that the freeze cycle is complete.

The controller may shut the air cooled fan motor off for a variable period of time to build up heat for harvest. This is dependant upon the temperature of the discharge line sensor.

**Harvest Cycle.** When the harvest cycle begins, the controller shuts off the fan motor, switches on the hot gas valve, and through a parallel circuit, the harvest assist solenoid. After a few seconds the purge valve opens and water is drained from the reservoir. Based on either the automatic purge or manual purge setting, the pump and purge valve will be switched off at a time determined to have drained enough water for that setting. The inlet water valve will open to fill the reservoir anytime the mid length probe is uncovered, which occurs during the reservoir drain cycle. Harvest continues as the hot discharge gas flows into the evaporator serpentine, heating up the evaporator. At the same time the harvest assist solenoid is pushing against the back of the ice slab. When the ice releases from the evaporator, it harvests as a unit, and the harvest assist probe provides some additional force to push it off. When the ice falls off it will force the curtain(s) open. An open curtain during the harvest cycle signals the controller that the evaporator has released its ice. If this is a single evaporator machine the controller will terminate harvest. If it is a two evaporator machine, the controller will continue harvest until both curtains have opened. If one curtain remains open, the controller will shut the machine down on bin full. Anytime harvest is complete the hot gas valve and harvest assist solenoid are shut off. The harvest assist solenoid pin returns to its normal position by spring pressure.

If the curtain(s) re-close after harvest, the freeze cycle will restart.

## How It Works - Water Cooled

---

**Freeze Cycle.** At start up the controller drains and refills the reservoir. The reservoir refills when the mid length water level sensor probe is uncovered and continues to fill until the top probe is in contact with water. When the reservoir has filled, the compressor and water pump start. After the discharge pressure has increased past the set point of the water regulating valve, the water regulating valve will open and warm water will be discharged out the condenser drain. The water regulating valve will modulate to maintain a relatively constant discharge pressure. Water flows over the evaporator as the refrigeration system begins to remove heat. When the water temperature falls to a preset point, as measured by the water temperature sensor, the controller shuts off the water pump for 30 seconds. The freeze cycle resumes when the pump restarts and ice begins to form on the evaporator. As it forms, the water flowing over the ice moves closer and closer to the metal tip of the ice thickness sensor. When it comes into contact with the sensor for a few continuous seconds, that signals the controller that the freeze cycle is complete.

**Harvest Cycle.** When the harvest cycle begins, the controller switches on the hot gas valve, and through a parallel circuit, the harvest assist solenoid. After a few seconds the purge valve opens and water is drained from the reservoir. Based on either the automatic purge or manual purge setting, the pump and purge valve will be switched off at a time determined to have drained enough water for that setting. The inlet water valve will open to fill the reservoir anytime the mid length probe is uncovered, which occurs during the reservoir drain cycle. Harvest continues as the hot discharge gas flows into the evaporator serpentine, heating up the evaporator. At the same time the harvest assist solenoid is pushing against the back of the ice slab. When the ice releases from the evaporator, it harvests as a unit, and the harvest assist probe provides some additional force to push it off. When the ice falls off it will force the curtain(s) open. An open curtain during the harvest cycle signals the controller that the evaporator has released its ice. If this is a single evaporator machine the controller will terminate harvest. If it is a two evaporator machine, the controller will continue harvest until both curtains have opened. If a curtain remains open, the controller will shut the machine down on bin full. Anytime harvest is complete the hot gas valve and harvest assist solenoid are shut off. The harvest assist solenoid pin returns to its normal position by spring pressure.

If the curtain(s) re-close after harvest, the freeze cycle will restart.

## How It Works - Remote

---

**Freeze Cycle.** At start up the controller drains and refills the reservoir. The reservoir refills when the mid length water level sensor probe is uncovered and continues to fill until the top probe is in contact with water. When the reservoir has filled, the liquid line valve, compressor and water pump are switched on. After the discharge pressure has increased past the set point of the headmaster in the condenser, the headmaster will direct refrigerant gas into the condenser and warm air will be discharged out of the condenser. The headmaster will modulate to maintain a minimum discharge pressure. Water flows over the evaporator as the refrigeration system begins to remove heat. When the water temperature falls to a preset point, as measured by the water temperature sensor, the controller shuts off the water pump for 30 seconds. The freeze cycle resumes when the pump restarts and ice begins to form on the evaporator. As it forms, the water flowing over the ice moves closer and closer to the metal tip of the ice thickness sensor. When it comes into contact with the sensor for a few continuous seconds, that signals the controller that the freeze cycle is complete.

**Harvest Cycle.** When the harvest cycle begins, the controller switches on the hot gas valve, and through a parallel circuit, the harvest assist solenoid. After a few seconds the purge valve opens and water is drained from the reservoir. Based on either the automatic purge or manual purge setting, the pump and purge valve will be switched off at a time determined to have drained enough water for that setting. The inlet water valve will open to fill the reservoir anytime the mid length probe is uncovered, which occurs during the reservoir drain cycle. Harvest continues as the hot discharge gas flows into the evaporator serpentine, heating up the evaporator. At the same time the harvest assist solenoid is pushing against the back of the ice slab. When the ice releases from the evaporator, it harvests as a unit, and the harvest assist probe provides some additional force to push it off. When the ice falls off it will force the curtain(s) open. An open curtain during the harvest cycle signals the controller that the evaporator has released its ice. If this is a single evaporator machine the controller will terminate harvest. If it is a two evaporator machine, the controller will continue harvest until both curtains have opened. If a curtain remains open, the controller will shut the machine down. Anytime harvest is complete the hot gas valve and harvest assist solenoid are shut off. The harvest assist solenoid pin returns to its normal position by spring pressure.

If the curtain(s) re-close after harvest, the freeze cycle will restart.

Shut down occurs when a curtain remains open after a harvest cycle. The controller will switch off the liquid line solenoid valve and operate the compressor for 30 seconds, then shut it off.

## Electrical Sequence - Air or Water Cooled

---

Power connected, unit previously switched Off.

Control board does a self check. If the self check fails, the unit displays an E and no further action will occur.

If the self check passes, the controller will display a 0, the curtain light(s) will be ON and the Power and Sump Empty lights will be ON.

Pushing and releasing the On button will start the ice making process.

*The display will begin to blink F. The component indicator lights will switch on and off to match the following process:*

The purge valve opens and the water pump starts to empty the reservoir. This is done to discharge any excess water from ice melting into the reservoir.

The hot gas valve and the harvest assist solenoid are energized.

The inlet water valve will open to fill the reservoir. The water valve can open any time the water level is low.

After a few seconds the purge valve closes and the pump shuts off.

When the reservoir is full the inlet water valve stops and the compressor switches on. Five seconds after the compressor starts the hot gas valve and the harvest assist solenoid are de-energized.

*Light Information: The display shows a non-blinking F. The Power and Status Lights will be Green. The compressor, fan motor, water pump, sump full and one or two curtain switch lights will be ON.*

The air cooled model's fan motor will start to turn when the discharge pressure has built up to the fan pressure control's cut in point. This is about 15 seconds after the compressor starts.

The Freeze cycle continues. The compressor, water pump, fan motor and curtain indicator lights will be ON. When the reservoir water temperature falls to a certain preset point, the water pump will shut off for 30 seconds. This is the anti-slush period. At this time the controller checks the conductivity of the water in the reservoir for the auto-purge feature. After the water pump restarts the Sump Full light will go out and neither sump lights will be on for the rest of the freeze cycle.

When the ice has built up enough so that the water flowing over the evaporator comes into continuous contact with the ice level sensor, the Ready to Harvest light will begin to blink on and off. When it has been On continuously for 5 seconds, the controller will switch the machine into a Harvest cycle.

## Electrical Sequence - Air or Water Cooled

---

*Indicator Information: The display shows a non-blinking H. The Power and Status Lights will be Green. The compressor, hot gas valve and one or two curtain switch lights will be ON. After a few seconds the water pump, purge valve and inlet water valve lights will come on.*

The fan motor(s) shut off and remain off throughout the harvest cycle.

The harvest assist solenoid is connected in parallel with the hot gas valve. Although it is energized throughout the harvest cycle, its piston does not move until the ice has become partially loosened from the evaporator plate by the action of the hot refrigerant gas passing through the evaporator serpentine.

The water pump and purge valve will shut off when the purge level setting time has been reached, either the manual time or the automatic time. The inlet water valve will remain on until it fills the reservoir. The Ready to Harvest light will switch Off when the ice falls from the evaporator.

Harvest continues until the ice slab is ejected from the evaporator and falls, opening the curtain. When the curtain opens, the magnetic reed curtain switch opens, breaking the circuit to the controller. If the curtain re-closes within 30 seconds, the controller switches the machine back into another freeze cycle. If the curtain switch remains open, the controller shuts the machine down and puts it into a standby position.

## Electrical Sequence - Remote Cooled

---

Power connected, unit previously switched Off.

Control board does a self check. If the self check fails, the unit displays an E and no further action will occur.

If the self check passes, the controller will display a 0, the curtain light(s) will be ON and the Power and Sump Empty lights will be ON.

Pushing and releasing the On button will start the ice making process.

*The display will begin to blink F. The component indicator lights will switch on and off to match the following process:*

The purge valve opens and the water pump starts to empty the reservoir. This is done to discharge any excess water from ice melting into the reservoir.

The hot gas valve and the harvest assist solenoid are energized.

The inlet water valve will open to fill the reservoir. The water valve can open any time the water level is low.

After a few seconds the purge valve closes and the pump shuts off.

When the reservoir is full the inlet water valve stops, the liquid line valve is opened and the compressor switches on. Five seconds after the compressor starts the hot gas valve and the harvest assist solenoid are de-energized.

*Light Information: The display shows a non-blinking F. The Power and Status Lights will be Green. The compressor, fan motor, water pump, sump full and one or two curtain switch lights will be ON.*

The Freeze cycle continues. When the reservoir water temperature falls to a certain preset point, the water pump will shut off for 30 seconds. This is the anti-slush period. At this time the controller checks the conductivity of the water in the reservoir for the auto-purge feature. After the water pump restarts the Sump Full light will go out and neither sump lights will be on for the rest of the freeze cycle.

When the ice has built up enough so that the water flowing over the evaporator comes into continuous contact with the ice level sensor, the Ready to Harvest light will begin to blink on and off. When it has been On continuously for 3 seconds, the controller will switch the machine into a Harvest cycle.

*Indicator Information: The display shows a non-blinking H. The Power and Status Lights will be Green. The compressor, hot gas valve and one or two curtain switch lights will be ON. After a few seconds the water pump, purge valve and inlet water valve lights will come on.*

## Electrical Sequence - Remote Cooled

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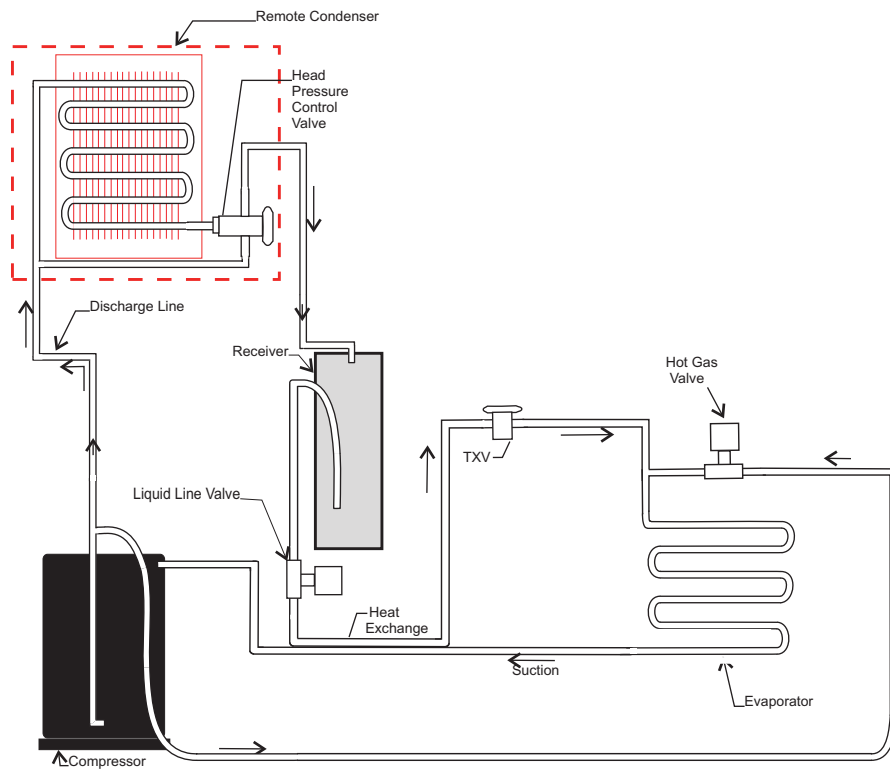
The harvest assist solenoid is connected in parallel with the hot gas valve. Although it is energized throughout the harvest cycle, its piston does not move until the ice has become partially loosened from the evaporator plate by the action of the hot refrigerant gas passing through the evaporator serpentine.

The remote condenser fan motor is powered by the compressor contactor, so it will be operating during the harvest cycle.

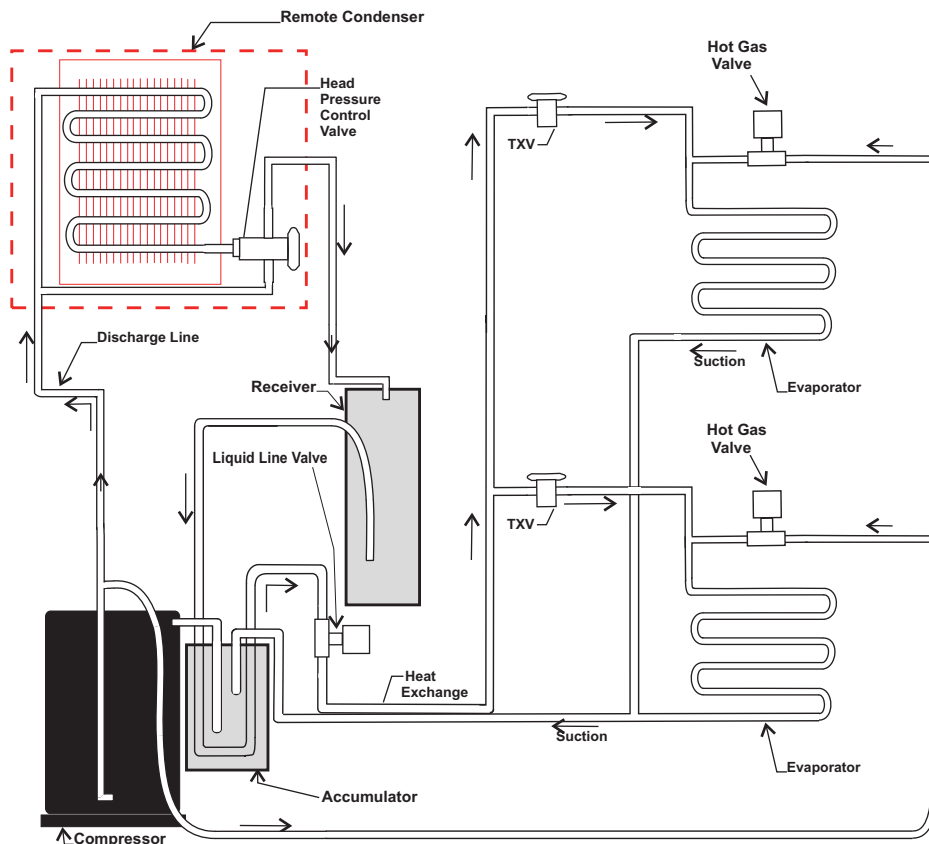
The water pump and purge valve will shut off when the purge level setting time has been reached, either the manual time or the automatic time. The inlet water valve will remain on until it fills the reservoir. The Ready to Harvest light will switch Off when the ice falls from the evaporator.

Harvest continues until the ice slab is ejected from the evaporator and falls, opening the curtain. When the curtain opens, the magnetic reed curtain switch opens, breaking the circuit to the controller. If the curtain re-closes within 30 seconds, the controller switches the machine back into another freeze cycle. If the curtain switch remains open, the controller shuts the machine down and puts it into a standby position.

# Remote Schematics



C0522R, C0530R, C0630R and C1030R



C1448R, C1848R and C2148R



## Electrical Component Details

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### Compressor

- Operated by the compressor contactor. Single phase self contained models have PTCR and run capacitor.

### Contactors

- Operated by the controller and the high pressure cut out switch. Line voltage coil. When energized the Compressor indicator light will be ON.

### Water Pump

- Operated by the controller. When energized, the Water Pump indicator light will be ON.

### Inlet Water Solenoid Valve

- Operated by the controller. Line voltage coil. When energized, the Water Solenoid indicator light will be ON.

### Purge Valve

- Operated by the controller. Line voltage coil. When energized, the Purge Valve indicator light will be ON. Energized for a time during harvest.

### Fan Motor(s)

- Operated by the controller and the fan pressure control. Can cycle on and off in the freeze cycle, always off during harvest. When the controller has energized it, the indicator light will be ON but the fan will not turn unless the discharge pressure is high enough to close the high pressure control.
- Fan(s) may shut off near the end of the freeze cycle to build up heat for harvest. Time of shut off depends upon available heat, as measured by the discharge temperature.

### High pressure cut out

- Some air cooled and all remote and all water cooled models have a high pressure cut out switch that shuts the power off to the compressor contactor if the discharge pressure is too high. It is an automatic reset.

### Harvest Assist Solenoid(s)

- Operated by the controller in parallel with the hot gas valve. Cycles on and off at the beginning of a restart. Energized throughout the harvest cycle. Line voltage coil.

## Electrical Component Details

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### Liquid Line Valve

- Remote only. Opened by the controller to start a freeze cycle. Closed to shut unit off. Line voltage coil.

### Hot Gas Valve(s)

- Operated by the controller in parallel with the harvest assist solenoid. Cycles on and off at the beginning of a restart. Energized throughout the harvest cycle. Line voltage coil.

### Controller

- Senses ice thickness, water level, water temperature, discharge temperature. Controls compressor contactor, fan motor, water pump, inlet water valve, hot gas valve, purge valve, harvest assist solenoid. Indicates status and component operation. 12 volt.

### Transformer

- 12 volt secondary, supplies power to controller only.

### Water Level Sensor

- Three probe conductivity sensor. Bottom probe is common, mid probe is refill sump, top probe is full sump. Refill can occur at any time.

### Ice Thickness Sensor

- Single wire conductivity sensor. Circuit made from controller to ground to controller when water contacts a probe suspended over ice plate. Signals ready for harvest.

### Curtain Switch(es)

- Magnetic reed switch. Normally open, switch is closed when magnet is nearby. Models with two evaporators have two curtain switches. Single switch can be connected to either J8 or J7 of controller. Curtains may be removed in the freeze cycle without affecting controller operation. A curtain removed during harvest will cause the controller to terminate harvest and shut the unit off. Two curtain models require both curtains to open to terminate harvest, and if either one remains open for 30 seconds that signals the controller to shut the unit off on bin full.

### Water temperature sensor.

- Thermistor inserted into the water pump discharge hose. Reported temperature used by the controller to determine anti-slush cycle start time.

## Electrical Component Details

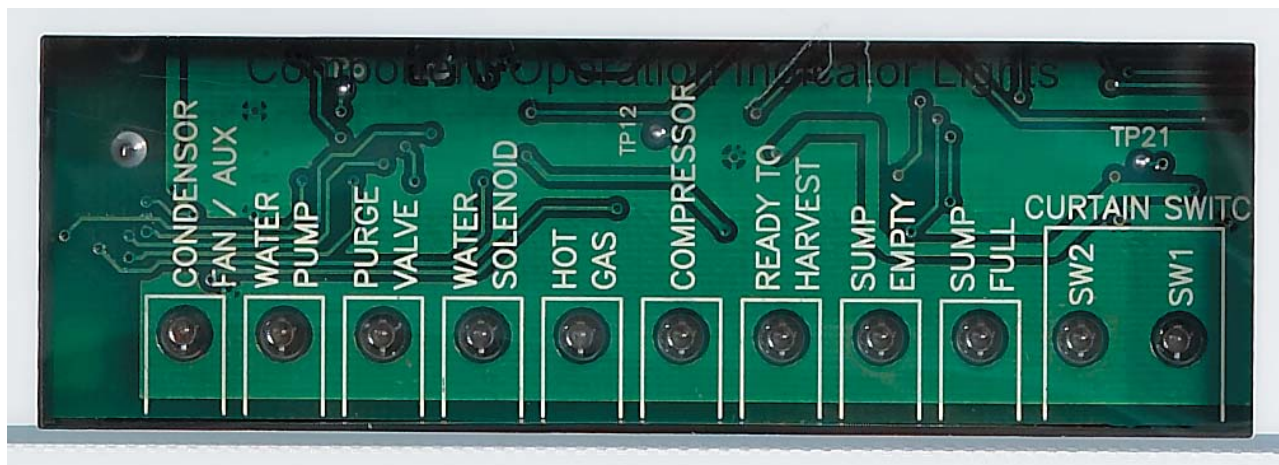
### Discharge temperature sensor.

- Thermistor attached to the discharge line near the compressor. Reported temperature used by the controller to determine end-of-cycle-fan-off-delay time. If discharge temperature exceeds a preset maximum, controller will shut the machine off.

Note: Controller will operate machine in a default mode with thermistors disconnected from the controller. Diagnostic code #5 or 7 will be displayed during that time.

### Component Indicator Light Table

System	Indicator Light ON
Condenser Fan or Liquid Line Valve	Fan Motor Powered or LLV open
Water Pump	Pump Motor Powered
Purge Valve	Purge Valve Opens
Inlet Water Solenoid Valve	Inlet Water Valve Opens
Hot Gas	Hot Gas Valve Opens
Compressor Contactor	Contactors Closes
Ready to Harvest	Water contacting ice thickness sensor probe
Sump Empty	Open between mid sensor and common
Sump Full	Closed between top probe and mid probe
Curtain Switch	Curtain open



Component Indicator Lights

## Refrigeration

---

**Refrigerant:** R-404A

**Compressors:** Copeland or Tecumseh hermetic by model

**Expansion valves:** Non adjustable, internally equalized, one per evaporator.

**Hot gas valves:** Pilot operated, line voltage coils. One per plate.

**Condensers:** Forced draft air, counterflow water. All air cooled models have left side air inlet. 48" wide air cooled models also have front air inlet. All air cooled models exhaust air out the back.

**Air filters:** Surface mounted to panels. Filter media removable without removing panels.

**Fan blades:** Reduced vibration blades in most air cooled models.

**Remote Systems:** Head pressure control valves in condenser. No check valves. Headmaster protected by filters (not filter driers). Controller pumps unit down by closing the liquid line valve and keeping the compressor on for a fixed time period at shut down.

**Fan pressure control.** All AC. Controls fan motor operation in the freeze cycle.

**High pressure cut out.** WC, RC, AC with Tecumseh compressors.

**Evaporator:** Unified cell plate. Nickel plated copper. Three heights: 6", 12" and 18". Small cube = half dice, medium cube = full dice.

Small cube: 7/8" high x 7/8" deep x 3/8" high

Medium cube: 7/8" high x 7/8" deep x 7/8" high

## Water System

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**Batch type.** Insulated water reservoir contains full water charge for each ice making cycle.

**Water valve:** Solenoid type. Opens to fill reservoir when mid sensor probe no longer makes a circuit to the bottom probe. Closes when reservoir is full and top probe makes circuit to mid probe.

**Pump:** Unsealed pedestal type, twist-release mounting

**Water purge valve:** Solenoid type. Opens to purge water during harvest cycle.

**Water Level Sensor:** Three probe conductivity.

**Distributor:** ABS plastic. Evenly distributes water over the evaporator surface. Slides off the evaporator top. Removable cover for ease of cleaning.



Water Distributor Removal

# Control Operation

---

## Standard control:

- Electronic controller operating from a 12 AC volt power supply. Will operate within a voltage range between 10 and 15.5.
- User's Indicator lights, four front visible: Power, Status, Water, De-scale/Sanitize.
- Accessible On switch.
- Accessible Off switch.
- Code Display: Displays letters and numbers to indicate cycles and diagnostic codes.
- Manual Harvest switch: Use to trigger harvest at any time.
- Clean switch: Use to initiate and finish the de-scale or sanitizing cycles.
- Component Operation Indicator Lights: Indicate the status of certain components; water level; ready for harvest; curtain switch position.
- Power Light: On when power is being supplied to the controller.
- Status Light: Green when machine is in ice making mode and is operating correctly. Blinks red when a machine malfunction has been detected.
- Water Light: Blinks red when reservoir does not fill with allowed time period.
- De-scale / sanitize: Yellow when the controller has determined it is time to de-scale and sanitize the machine. Use clean process to reset light. Time is determined by power up time and controller's setting. Standard setting is 6 months. See adjustment process

## Controller Connections:

- J1 – Ground and Power Supply
- J2 – High voltage power harness to loads
- J3 – Factory use
- J4 – Optional board connector
- J5 - Communications port
- J6 – Thermistor connection
- J7 – Curtain switch
- J8 – Curtain switch
- J9 – Water level sensor
- J10 – Ice thickness sensor
- J11 – Bin thermostat. Use with NO thermostat (closes on temperature fall) & specified harness.

## Control Safeties

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### **Max freeze time – 45 minutes**

When exceeded, the controller will attempt another freeze cycle. If the next cycle's freeze time is less than maximum, the control will continue normal ice making. If the next freeze cycle was too long, the control will again attempt another freeze cycle. If the freeze cycle is too long three consecutive cycles, the controller will shut the unit off and it must be manually reset.

### **Min freeze time – 6 minutes**

If the controller switches the machine into harvest within 20 seconds of the minimum freeze time, the controller will harvest for a preset time and does not stop if the curtain switch opens. If this occurs again in the next three cycles, the machine will shut down and must be manually reset.

### **Max harvest time – 3.5 minutes**

If the harvest cycle has continued for 3.5 minutes without the curtain opening, the controller will shut the machine off for 50 minutes and then restart. If there is another the machine will shut the machine off for another 50 minutes and then restart. If it fails a third consecutive time the controller will shut the machine down and must be manually reset.

- Time between resets – 50 minutes
- Number of automatic resets – 2
- Max water fill time – 5 minutes. Machine will attempt a restart every 20 minutes.
- Max discharge temp – 250 degrees F.
- Time interval between cleanings – 6 months power on time - adjustable in one month increments, can be set at 6, 5, 4 or 3 months of power up time.
- Manual harvest time – 3 minutes
- Pump down interval – remote only. 12 hours. Pump down is 30 seconds of compressor only on time.
- Minimum compressor off time – 4 minutes
- Continuous Run Time Maximum Cycles - 200

## Restarts

---

### Power Interruption

The controller will automatically restart the ice machine after adequate voltage has been restored.

- *H* blinks on code display
- Status indicator light blinks
- Reservoir is drained and refilled

Default harvest is initiated. The curtain switch does not have to open to terminate harvest, harvest will continue until the default harvest time expires. Default harvest time is 3 minutes. The machine will then return to a normal freeze cycle.

### Water Interruption

- The controller will attempt to fill the reservoir every twenty minutes until it is successful.

### On-Off Switch Access

All models ship with the On and Off switches front accessible. If desired, the On and Off switches can be covered by changing the bezel in the front panel's trim strip. A cover-up bezel ships loose with the machine.



## Control Button Use (from standby)

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**Set purge level**, 1-5 (1 is minimum, 5 is maximum) or Automatic:

- Hold off button in for 3 seconds. Release.
- Press and release the On button to cycle through and select one of the five purge settings or to use the Automatic setting.

**Recall diagnostic code:**

- Hold off button in for 3 seconds. Release.
- Press and release the Harvest button to cycle through each of the last 10 error codes from most recent to oldest.

**Clear diagnostic code:**

- Hold Clean and Harvest buttons in for 3 seconds to clear all prior codes.

**Reset control:**

- Depress and release Off, then depress and release On

**Start Test Mode:**

- Hold Off button in for 3 seconds. Release.
- Hold Clean button in for 3 seconds. Release.

**Lock / Unlock control:**

- Hold On button in for 3 seconds, keep holding then press and release Off twice.

**Empty reservoir:**

- Hold Clean button in for 3 seconds. Release. Pump and purge valve will be ON for 30 seconds. Repeat as needed.

**Test Mode:** See next page for Air and Water Cooled mode.

- Depress Off for 3 seconds, release. Then depress Clean for 3 seconds.
- The sump will fill the first 30 seconds of the test. If the sump is full it will overflow into the bin. At 30 seconds the WIV will shut off and the WP will turn on. You will be able to see and hear the water running over the plates. After 10 seconds the PV and HGV will turn on. Water will be purging from the machine. After 10 more seconds the compressor will start. 5 seconds later the HGV will close. The compressor will run for a total of 20 seconds. After which everything will turn off for 5 seconds. After that time the HGV will open and you'll be able to hear the hissing as the pressure is equalized. 10 seconds later the fan will turn on (if air cooled and fan control jumped). After 10 seconds all will be off and the output test will be complete.

## Control Button Use - continued

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### Change De-Scale Notification Interval

Like the others, this feature is accessible only from standby (Status Light Off).

1. Press and hold harvest button for 3 seconds.

Starts the Time to Clean Adjustment State and displays the current time to clean setting.

2. Press the clean button repeatedly to cycle through the 4 possible settings:

Rev 5 and up (10/08 production start)

- 1 year (8760 hours)
- 0 (disabled)
- 4 months (2920 hrs)
- 6 months (4380 hours) (default)

Prior

- 6 months
- 5 months
- 4 months
- 3 months

3. Press Off or leave untouched for 60 seconds to select the displayed interval

### Test Mode Sequence Table - Air or Water Cooled

Time (seconds)	On	Off
0	WIV - 30 seconds	WP, HGV, Comp, Fan, PV
30	WP - 10 seconds	WIV, HGV, Comp, Fan, PV
40	WP, PV, HGV - 10 seconds	WIV, Comp, Fan
50	HGV, Comp - 5 seconds	WIV, WP, Fan, PV
55	Comp - 15 seconds	WIV, HGV, WP, Fan, PV
70	None - 5 seconds	All
75	HGV - 10 seconds	WIV, WP, Comp, Fan, PV
85	Fan - 10 seconds	WIV, HGV, WP, Comp, PV
95	None	All – Test Complete

## Diagnostics – Air Cooled

### No ice

Problem	Likely Cause	Probable Solution
No power to unit	Power disconnected	Check breaker or fuse. Reset or replace, restart and check
No power to controller	Transformer open	Replace transformer
Shut down on maximum water fill time	Water shut off	Restore water supply
Shut down on maximum freeze time	Water leak	Check purge valve, curtain, sump, pump hose
	Air filters clogged	Clean air filters
	Dirty condenser	Clean condenser
	Restricted location, intake air too hot	Have machine moved
	Ice thickness sensor dirty or disconnected	Check ice thickness sensor probe
	Water distributor dirty	Remove and clean water distributor
	Inlet water valve leaks through during freeze	Check inlet water valve
	Connected to hot water	Check for bleed thru from / missing check valve in building water supply
	Incomplete harvest	Check harvest system
	High pressure cut out opened	Check fan motor pressure control, check fan motor, check controller using test mode
	Fan motor pressure control open	Check fan pressure control
	Fan motor not turning	Check fan motor, check fan blade, check controller using test mode
	Water pump not pumping	Check pump motor, check controller using test mode

## Diagnostics – Air Cooled

Problem	Likely Cause	Probable Solution
Shut down on maximum freeze time	Pump hose disconnected	Check hose
	Compressor not operating	Check compressor contactor, check controller using test mode
		Check compressor start components, check PTCR resistance and temperature
		Check compressor voltage
		Check compressor windings
	Low refrigerant charge	Add some refrigerant and restart unit. If cycle time improves, look for leak.
	Hot gas valve leaks through during freeze	Check hot gas valve for hot outlet during freeze
	Thermostatic expansion valve bulb loose	Check bulb
	Thermostatic expansion valve producing very low or very high superheat	Check evaporator superheat, change TXV if incorrect
	Compressor inefficient	Check compressor amp draw, if low and all else is correct, change compressor

## Diagnostics – Air Cooled

Problem	Likely Cause	Probable Solution
Shut down on maximum harvest time	Ice bridge thickness too small, not enough ice to open curtain	Check and adjust if needed
	Ice bridge thickness too large, ice frozen to evaporator frame	Check and adjust if needed
	Purge valve does not open, water melts ice bridge, not enough ice to open curtain	Check purge valve
	Incomplete ice formation	Check water distributor for partially plugged holes
	Curtain out of position	Check curtain for swing restriction
	Curtain switch does not open when curtain does	Check switch with ohmmeter
	Machine in very cold ambient	Move machine to a warmer location
	Hot gas valve does not open	Check hot gas valve, check controller using test mode
	Harvest assist probe out of position – ejector pin not retracted	Check harvest assist mechanism – spring should retract pin
	Damaged evaporator	Check evaporator surface
Fan motor stays on during harvest	Check controller using test mode	
Shut down on minimum freeze time	Grounded ice thickness sensor	Check sensor for dirt and position. Clean and check gap to evaporator surface.

## Low Ice Making Capacity - Air Cooled

Problem	Likely Cause	Probable Solution
Long freeze cycle	Dirty air filters	Clean filters
	Dirty condenser	Clean condenser
	Hot ambient	Reduce room air temperature
	Water leak	Check purge valve, check curtain
	Water inlet valve leaks through	Check inlet valve
	Low on refrigerant	Add refrigerant, if cycle time drops, check for leak
	Incorrect superheat	Check evaporator superheat, if significantly low or high, replace TXV
	Fan(s) cycle on and off	Check pressures fans cycle at. Replace fan pressure switch if too low
Long Harvest Cycle	Dirty evaporator	De-scale water system
	No harvest assist	Check harvest assist solenoid
	Bridge thickness too big	Check and adjust bridge thickness
	Machine in very cool ambient	Increase room temperature
False bin full signal	Ice jammed in between curtain and sump	Clear ice away
	Curtain does not close correctly	Check curtain for proper swing

## Makes Excessive Noise - Air Cooled

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<b>Problem</b>	<b>Likely Cause</b>	<b>Probable Solution</b>
Fan blade vibrates	Blade is bent	Replace fan blade
	Fan motor mount is broken	Replace motor mount
Compressor vibrates	Mounting bolts loose	Tighten bolts
Water pump vibrates	Pump bearings worn	Replace pump
Panels vibrate	Mounting screws loose	Tighten screws

## Diagnostics - Water Cooled

### No Ice

Problem	Likely Cause	Probable Solution
No power to unit	Power disconnected	Check breaker or fuse. Reset or replace, restart and check
No power to controller	Transformer open	Replace transformer
Shut down on maximum water fill time	Water shut off	Restore water supply
Shut down on maximum freeze time	Water leak	Check purge valve, curtain, sump, pump hose
	Ice thickness sensor dirty or disconnected	Check ice thickness sensor probe
	Water distributor dirty	Remove and clean water distributor
	Inlet water valve leaks through during freeze	Check inlet water valve
	Connected to hot water	Check for bleed thru from / missing check valve in building water supply
	Incomplete harvest	Check harvest system
	High pressure cut out opened	Water supply cut off, restore water supply to condenser
	Water pump not pumping	Check pump motor, check controller using test mode
	Pump hose disconnected	Check hose
	Compressor not operating	
		Check compressor start components, check PTCR resistance and temperature
		Check compressor voltage
		Check compressor windings



## Diagnostics - Water Cooled

Problem	Likely Cause	Probable Solution
Shut down on maximum freeze time	Low refrigerant charge	Add some refrigerant and restart unit. If cycle time improves, look for leak.
	Hot gas valve leaks through during freeze	Check hot gas valve for hot outlet during freeze
	Thermostatic expansion valve bulb loose	Check bulb
	Thermostatic expansion valve producing very low or very high superheat	Check evaporator superheat, change TXV if incorrect
	Compressor inefficient	Check compressor amp draw, if low and all else is correct, change compressor
Shut down on maximum harvest time	Ice bridge thickness too small, not enough ice to open curtain	Check and adjust if needed
	Ice bridge thickness too large, ice frozen to evaporator frame	Check and adjust if needed
	Purge valve does not open, water melts ice bridge, not enough ice to open curtain	Check purge valve
	Incomplete ice formation	Check water distributor for partially plugged holes
	Curtain out of position	Check curtain for swing restriction
	Curtain switch does not open when curtain does	Check switch with ohmmeter
	Machine in very cold ambient	Move machine to a warmer location
	Hot gas valve does not open	Check hot gas valve, check controller using test mode
	Harvest assist probe out of position – ejector pin not retracted	Check harvest assist mechanism – spring should retract pin
	Damaged evaporator	Check evaporator surface

## Diagnostics - Water Cooled

Problem	Likely Cause	Probable Solution
Shut down on minimum freeze time	Grounded ice thickness sensor	Check sensor for dirt and position. Clean and check gap.

Test Mode Sequence: - Air or Water Cooled

Time (seconds)	On	Off
0	WIV - 30 seconds	WP, HGV, Comp, Fan, PV
30	WP - 10 seconds	WIV, HGV, Comp, Fan, PV
40	WP, PV, HGV - 10 seconds	WIV, Comp, Fan
50	HGV, Comp - 5 seconds	WIV, WP, Fan, PV
55	Comp - 15 seconds	WIV, HGV, WP, Fan, PV
70	None - 5 seconds	All
75	HGV - 10 seconds	WIV, WP, Comp, Fan, PV
85	Fan - 10 seconds	WIV, HGV, WP, Comp, PV
95	None	All – Test Complete

## Low ice Making Capacity - Water Cooled

Problem	Likely Cause	Probable Solution
Long freeze cycle	Water leak	Check purge valve, check curtain
	Water inlet valve leaks through	Check inlet valve
	Low on refrigerant	Add refrigerant, if cycle time drops, check for leak
	Incorrect superheat	Check evaporator superheat, if significantly low or high, replace TXV
Long Harvest Cycle	Dirty evaporator	De-scale water system
	No harvest assist	Check harvest assist solenoid
	Bridge thickness too big	Check and adjust bridge thickness
	Machine in very cool ambient	Increase room temperature
False bin full signal	Ice jammed in between curtain and sump	Clear ice away
	Curtain does not close correctly	Check curtain for proper swing

## Makes Excessive Noise - Water Cooled

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<b>Problem</b>	<b>Likely Cause</b>	<b>Probable Solution</b>
Compressor vibrates	Mounting bolts loose	Tighten bolts
Water pump vibrates	Pump bearings worn	Replace pump
Panels vibrate	Mounting screws loose	Tighten screws

## Diagnostics - Remote Air Cooled

### No Ice

Problem	Likely Cause	Probable Solution	
No power to unit	Power disconnected	Check breaker or fuse. Reset or replace, restart and check	
No power to controller	Transformer open	Replace transformer	
Shut down on max. water fill time	Water shut off	Restore water supply	
Shut down on maximum freeze time	Water leak	Check purge valve, curtain, sump, pump hose	
	Dirty condenser	Clean condenser	
	Restricted location, intake air too hot	Have condenser moved	
	Ice thickness sensor dirty or disconnected	Check ice thickness sensor probe	
	Water distributor dirty	Remove and clean water distributor	
	Inlet water valve leaks through during freeze	Check inlet water valve	
	Connected to hot water	Check for bleed thru from / missing check valve in building water supply	
	Incomplete harvest	Check harvest system	
	High pressure cut out opened		Check fan motor
			Check quick connects for complete piercing
	Fan motor not turning	Check fan motor, check fan blade	
	Water pump not pumping	Check pump motor, check controller using test mode	
	Pump hose disconnected	Check hose	
	Liquid line valve does not open	Check coil of valve, check controller using test mode.	
Compressor not operating	Check compressor contactor, check controller using test mode		

## Diagnostics - Remote Air Cooled

Problem	Likely Cause	Probable Solution
Shut Down on Maximum Freeze Time (continued)	Compressor not operating (continued)	Check compressor start components, check PTCR resistance and temperature
		Check compressor voltage
		Check compressor windings
	Low refrigerant charge	Add some refrigerant and restart unit. If cycle time improves, look for leak.
	Hot gas valve leaks through during freeze	Check hot gas valve for hot outlet during freeze
	Thermostatic expansion valve bulb loose	Check bulb
	Thermostatic expansion valve producing very low or very high superheat	Check evaporator superheat, change TXV if incorrect
	Compressor inefficient	Check compressor amp draw, if low and all else is correct, change compressor
Shut down on maximum harvest time	Debris in refrigeration system	Recover charge. Open quick connects, check for loose or missing foil. Open liquid line and hot gas valves. Check for debris. Replace drier, evacuate and weigh in nameplate charge.
	Ice bridge thickness too small, not enough ice to open curtain	Check and adjust if needed
	Ice bridge thickness too large, ice frozen to evaporator frame	Check and adjust if needed
	Purge valve does not open, water melts ice bridge, not enough ice to open curtain	Check purge valve
	Incomplete ice formation	Check water distributor for partially plugged holes
Curtain out of position	Check curtain for swing restriction	

## Diagnostics - Remote Air Cooled

Problem	Likely Cause	Probable Solution
Shut down on maximum harvest time (continued)	Curtain switch does not open when curtain does	Check switch with ohmmeter
	Machine in very cold ambient	Move machine to a warmer location
	Hot gas valve does not open	Check hot gas valve, check controller using test mode
	Harvest assist probe out of position – ejector pin not retracted	Check harvest assist mechanism – spring should retract pin
	Damaged evaporator	Check evaporator surface
Shut down on minimum freeze time	Grounded ice thickness sensor	Check sensor for dirt and position. Clean and adjust gap to evaporator surface using 13/64" drill bit as a gauge

## Low Ice Making Capacity - Remote

Problem	Likely Cause	Probable Solution
Long freeze cycle	Dirty condenser	Clean condenser
	Hot ambient	Check condenser inlet temp.
	Water leak	Check purge valve, check curtain
	Water inlet valve leaks through	Check inlet valve
	Low on refrigerant	Add refrigerant, if cycle time drops, check for leak
	Incorrect superheat	Check evaporator superheat, if significantly low or high, replace TXV
	Fan(s) cycle on and off	Check pressures fans cycle at. Replace fan pressure switch if too low
Long Harvest Cycle	Dirty evaporator	De-scale water system
	No harvest assist	Check harvest assist solenoid
	Bridge thickness too big	Check and adjust bridge thickness
	Machine in very cool ambient	Increase room temperature
False bin full signal	Ice jammed in between curtain and sump	Clear ice away
	Curtain does not close correctly	Check curtain for proper swing



## Makes Excessive Noise - Remote

Problem	Likely Cause	Probable Solution
Fan blade vibrates	Blade is bent	Replace fan blade
	Fan motor mount is broken	Replace motor mount
Compressor vibrates	Mounting bolts loose	Tighten bolts
Water pump vibrates	Pump bearings worn	Replace pump
Panels vibrate	Mounting screws loose	Tighten screws

### Test Mode Sequence - Remote

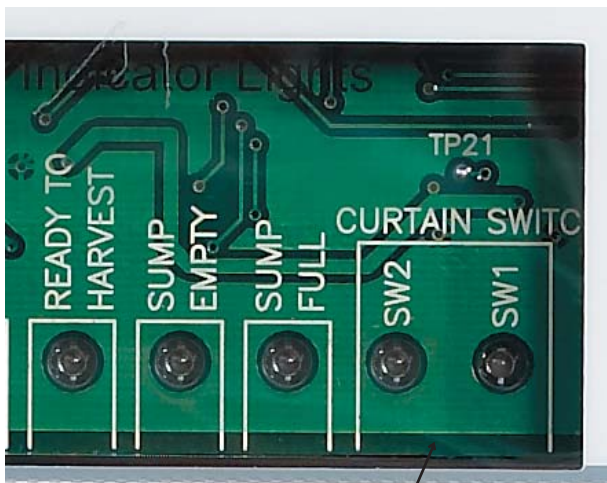
Test Time (seconds)	On	Off
0	WIV - 30 seconds	WP, HGV, Comp, BV, PV
30	WP - 10 seconds	WIV, HGV, Comp, BV, PV
40	WP, PV, HGV - 10 seconds	WIV, Comp, BV
50	HGV, Comp - 5 seconds	WIV, WP, BV, PV
55	Comp - 15 seconds	WIV, HGV, BV, WP, PV
70	None - 5 seconds	All
75	HGV - 5 seconds	WIV, WP, Comp, BV, PV
80	BV - 5 seconds	WIV, HGV, WP, Comp, PV
85	None	All – Test Complete

## Test Procedures - Sensors

All electrical components in this ice machine can be diagnosed with a volt-ohmmeter.

### Curtain Switch:

1. Test using the controller's indicator lights. Observe SW1 and SW2. Open and close the curtain in question. When the curtain is opened, the SW light will be ON. When the curtain gets to within a half inch of closing (at the switch) the SW light will go OUT.
2. Test with an ohmmeter. Disconnect electrical power. Open the control box cover. Unplug the curtain switch lead from the controller. Connect an ohmmeter to the leads of the switch. Open and close the curtain. When the curtain is closed, the switch is closed and there will be continuity. When the curtain is open, the switch is open and the circuit will be open.
3. Test the controller's curtain switch circuit by jumping the connectors on J1 or J2 together. Reconnect electrical power. When jumped, the matching SW light will go out. When unplugged or open, the SW light will be ON.



Curtain Switch  
Indicator Lights

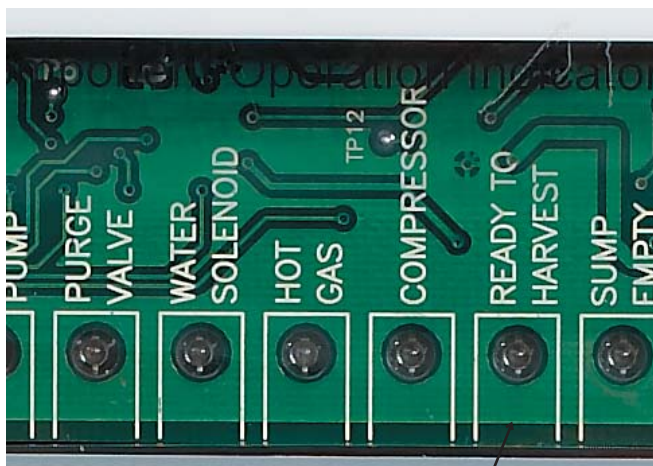
Light is ON when  
curtain is OPEN

Single curtain  
models have one  
indicator light ON  
all the time.



## Ice Thickness Sensor

1. Test using the controller's indicator light. Observe the Ready To Harvest light. Shut the machine off. Use a wire to connect the metal part of the Ice Thickness sensor to the evaporator or simply remove the Ice Thickness Sensor and touch its metal surface to the metal control box wall. The Ready for Harvest light should go ON.
2. Test with an Ohmmeter. Disconnect electrical power. Open the control box cover. Unplug the ice thickness sensor lead from the controller. Connect an ohmmeter lead to the ice thickness sensor lead, touch the other ohmmeter lead to the ice machine chassis. There must be an open circuit. If there is continuity, the sensor must be replaced. If there is no continuity, touch the ohmmeter lead to the metal part of the ice thickness sensor. There should be continuity. If open, check the ice thickness sensor for scale build up. Clean and recheck. If still open, replace the ice thickness sensor.
3. Test the controller's ice thickness sensor circuit by connecting a wire from J10 to ground. Reconnect electrical power. The Ready for Harvest light should go ON.



Ready To Harvest light is ON when water contacts ice thickness sensor.



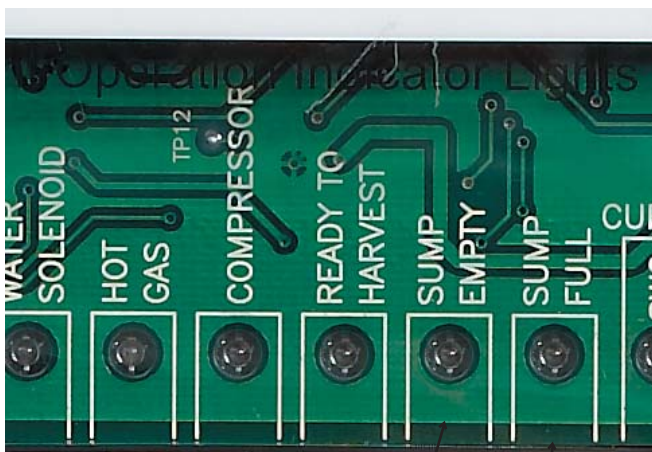
Ice Thickness Sensor

## Water Level Sensor

1. Test using the controller's indicator lights (sump empty and sump full). Unit must be powered up and there must be water in the sump. Add some manually if needed. Locate water level sensor. Release from sump cover and slowly lift up until the mid-length probe is out of the water. The sump empty light should come on, and if the unit is on the inlet water solenoid valve will open to fill the reservoir. Return the water level sensor to its normal position. If the unit is on and calling for ice the water will fill until the top probe is in contact with it, at that time the sump full light will switch ON.

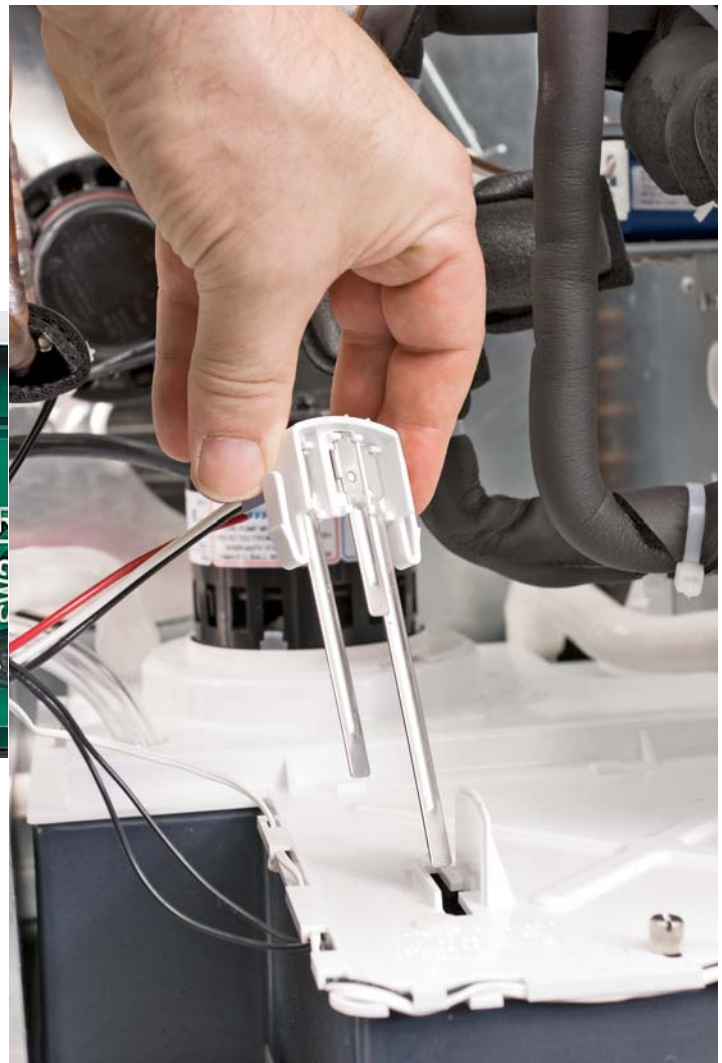
2. Test with an ohmmeter. Disconnect electrical power. Open the control box cover. Unplug the connector at J9. Locate water level sensor and remove it from the sump cover. Test 1: Place one lead of the ohmmeter on the longest probe and the other on the controller end of the red wire, there should be continuity. Test 2: Place one lead on the controller end of the white wire and the other on the mid-length probe, there should be continuity. Test 3: Place on lead on the controller end of the black wire and the other on the shortest probe, there should be continuity. If not, clean the probes and recheck.

3. Test the controller's water level sensor circuit. Reconnect electrical power. Unplug harness from water level sensor, the sump empty light should be ON. Jump harness wires white and black. The sump full light should be ON. Jump harness wires white and red, the sump full and sump empty lights will be OFF. Check harness wire by wire for continuity if there is no reaction from the controller during this test.



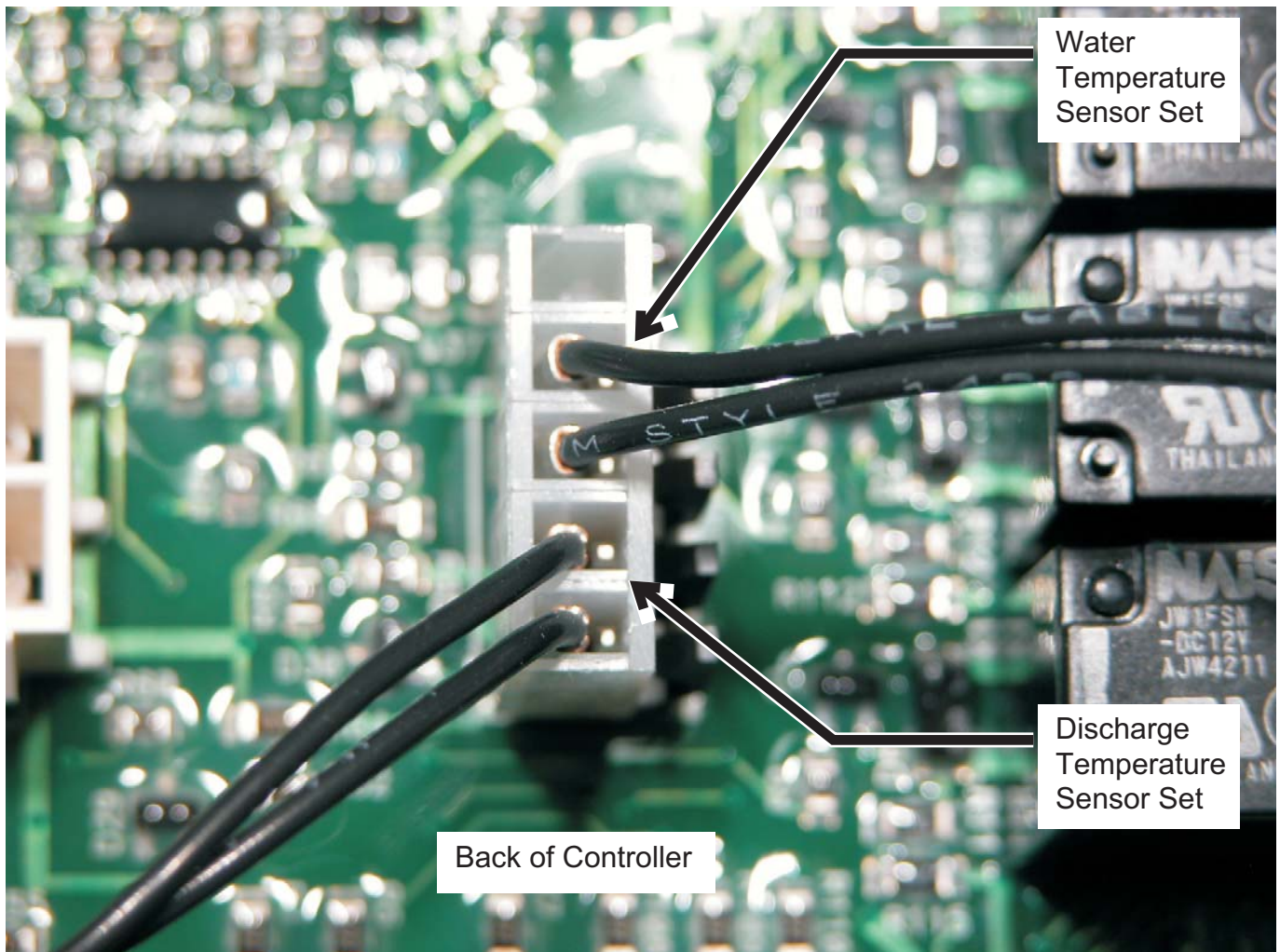
Sump Empty Light

Sump Full Light



## Temperature Sensors

1. Check controller. If the sensor calibration is completely out of range, the code display will read either 5 or 7.
2. Check with an ohmmeter. Open control box cover, unplug sensor from J6. Water temperature probe: Measure the temperature of the water. Push and release the clean button. Wait one minute. Measure the resistance of the water probe (two leads next to the open socket) and compare to the resistance in the chart for that temperature. Any reading within 1000 ohms is acceptable. Discharge sensor: Measure the temperature of the discharge line as close to the sensor as possible. Measure the resistance of the discharge temperature sensor (two leads farthest away from the open socket on the harness connector) and compare to the resistance in the chart for that temperature. Any reading within 1000 ohms is acceptable.
3. Alternate procedure: Remove both water and discharge sensors from their places on the ice machine. Put both into a container of ice water. Put a thermometer in the water. When the thermometer is at 32 degrees F., check the resistance of each sensor. The resistance should be within 1000 ohms of 32649.



## Test Procedures - Loads

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### Compressor

#### Failure to start.

Single phase models. All have resistance start, capacitor run type motors. Check voltage to compressor at the contactor. Compare the idle voltage (compressor off) to the active voltage (compressor starting). The supply voltage must not be less than the lowest rated voltage for the ice machine. If the voltage is correct, proceed to the next step.

Check starting components. Most models use a PTCR to cut power to the start winding after the compressor has started. Check the PTCR for resistance. The resistance check must be when the PTCR is at room temperature – any temperature between 50 and 100.

At that temperature resistance should be very low between 25 and 50 ohms. Also check resistance to ground, it should be infinite. If the PTCR is good, check the compressor windings.

Measure resistance from Common to ground. It should be infinite. Measure resistance from Common to Run – compare to the chart. Measure resistance from Common to Start – compare to the chart.

Compressor check for high amp draw. Measure amp draw of starting circuit. If it does not drop off immediately after start up, the PTCR should be replaced. It is not practical to check a PTCR for resistance at high temperatures as the resistance drops very fast as the PTCR's temperature falls. If the compressor is drawing excessive amps but is operating, the run capacitor may be open. Disconnect electrical power, discharge the capacitor and measure its resistance. If open, replace it. If shorted to ground, replace it.

Any time the compressor is replaced, the PTCR and run capacitor should also be replaced, or if the model was equipped with a potential relay, start capacitor and run capacitor, those should be replaced with the compressor. Most Scotsman service compressors include those parts.

Some systems use a potential start relay and start capacitor in place of the PTCR.

Potential relay. If the compressor will not start, check the amp draw of the starting circuit. If very low, the potential relay contacts or start capacitor may be open. Measure the resistance of the potential relay contacts and the start capacitor. If either is open it should be replaced. If the compressor starts but draws very high amps from the starting circuit, the potential relay may not switch off. In that case the relay should be replaced.

# Compressor Electrical Chart

Resistance reading tolerance is +/- 10%

Ice Machine	Voltage/Hz/Phase	Compressor	Start Winding Ohms	Run Winding Ohms
C0330-1	115/60/1	AKA9438ZXA	4.22	.59
C0330-6	230/50	AKA9438ZXC	7.11	2.69
C0330-32	208-230/60/1	AKA9468ZXD	10.43	1.77
C0530-1 A or B	115/60/1	AKA9451ZXA	5.95	.69
C0530-6 A or B	230/50	AKA9451ZXC	7.11	2.69
C0530-32 A or B	208-230/60/1	AKA9451ZXD	10.43	1.77
C0530 -1 C	115/60/1	RST45C1E-CAA		
C0530 - 6 C	230/50/1	RST45C1E-CAB		
C0530 - 32 C	208-230/60/1	RST45C1E-CAV		
C0630-32	208-230/60/1	AJA7490ZXD	2.74	1.52
C0630-6	230/50	AJA7490ZXC	2.23	2.02
C0830-32	208-230/60/1	CS10K6EPFV	3.10	1.16
C0830-6	230/50	CS10K6EPFJ	3.79	1.39
C0830-3	208-230/60/3	CS10K6ETF5	-	1.77
C1030-32	208-230/60/1	CS12K6EPFV	3.10	1.16
C1030-6	230/50	CS12K6EPFJ	3.79	1.39
C1030-3	208-230/60/3	CS12K6ETF5	-	1.77
C1448-32	208-230/60/1	CS14K6EPFV	2.66	1.08
C1448-6	230/50	CS14K6EPFJ	2.64	1.4
C1448-3	208-230/60/3	CS14K6ETF5	-	-
C1848-32	208-230/60/1	CS20K6EPFV	2.37	.65
C1848-6	230/50	CS20K6EPFZ		
C1848-3	208-230/60/3	CS20K6ETF5	-	-
C2148-32 WC	208-230/60/1	CS24K6EPFV	2.35	.53
C2148-6 WC	230/50	CS24K6EPFZ		
C2148-3 WC	208-230/60/3	CS24K6ETF5	-	-
C2148-32 R	208-230/60/1	CS27K6EPFV	2.35	.53
C2148-6 R	230/50	CS27K6EPFZ		
C2148-32 R	208-230/60/3	CS27K6ETF5	-	-

## Refrigerant Charges

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Model	R-404A in ounces
C0322A	14
C0322W	11
C0330A	14
C0330W	11
C0522A	17
C0522W	14
C0522R	160
C0530A (A or B series)	22
C0530A C series	21
C0530W (A thru C series)	11
C0530R (A thru C series)	160
C0630A	36
C0630W	14
C0630R	160
C0830A	46
C0830W	34
C0830R	208
C1030A	48
C1030W	38
C1030R	208
C1448A	62
C1448W	56
C1448R	256
C1848A	62
C1848W	63
C1848R	320
C2148W	69
C2148R	320



## Test Procedures - Loads

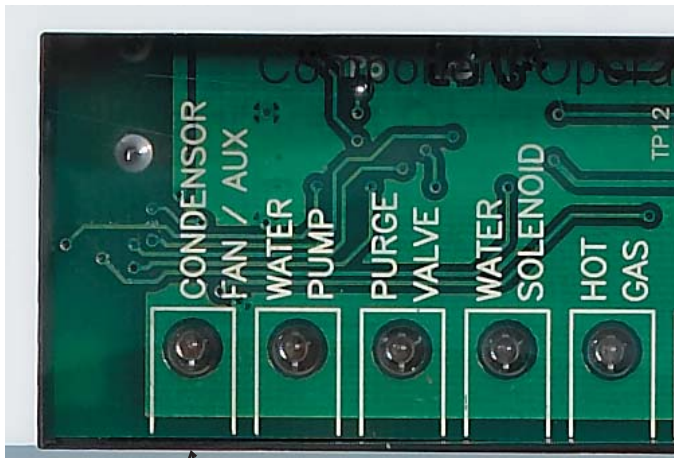
### Fan motor

1. Test using the controller's indicator lights.

Note: Fan pressure control connection must be jumped to perform this test.

Put the controller into test mode (depress Off for 3 seconds then depress Clean for 3 seconds). At the end of the test cycle, the fan motor will be powered and the Condenser Fan motor indicator light will be on. The fan motor should start and run at that time. If it does not, repeat the test but check the voltage to the fan motor, it must receive full voltage at the fan motor lead connection at the end of the test. If there is voltage and the motor does not operate, replace the motor. If there is no voltage, check the controller high voltage harness connection. The fan motor lead is the top wire. Check voltage from it to ground, at the end of the test, when the fan motor indicator light is On, there must be voltage from this pin to ground. Note: high voltage power is supplied to the bottom pin from the contactor line. Refer to the machine wiring diagram as needed.

2. Test using an ohmmeter. Disconnect electrical power. Unplug fan motor from harness. Measure fan motor winding resistance. If open, replace the fan motor.



This light is ON when the fan motor should be in operation.



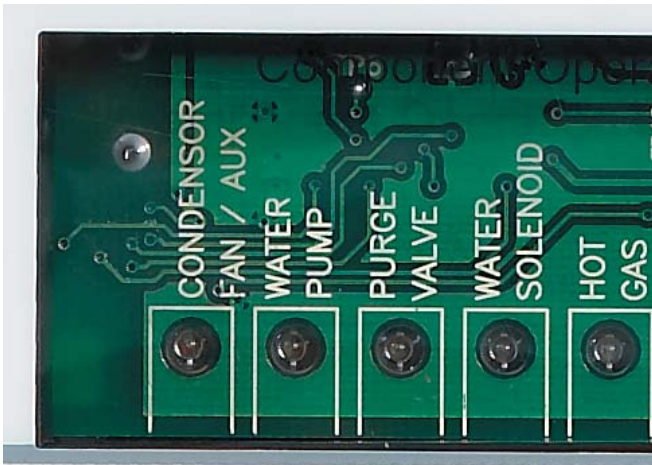
Fan Pressure Control must CLOSE to operate fan motor.

## Test Procedures - Loads

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### Water Pump

1. Test using the controller's indicator lights. Check the indicator light during the freeze cycle. The light will be On for all but the 30 second anti-slush period, so observe the light for one minute. When it is On, check the water pump, it should be operating. If not, check voltage to the pump. If low check the voltage from the controller to ground. The water pump pin is number 6. If there is voltage at that pin to ground, but very low voltage at the pump motor, there must be a broken wire in the harness. If the voltage is low at pin 6, the controller should be replaced.
2. Test using an ohmmeter. Disconnect electrical power. Unplug the water pump motor leads from the harness. Measure the resistance of the motor windings. If open, replace the pump. Measure resistance to ground. If there is any, replace the pump.



Water pump light is ON when pump is in operation.

## Test Procedures - Loads

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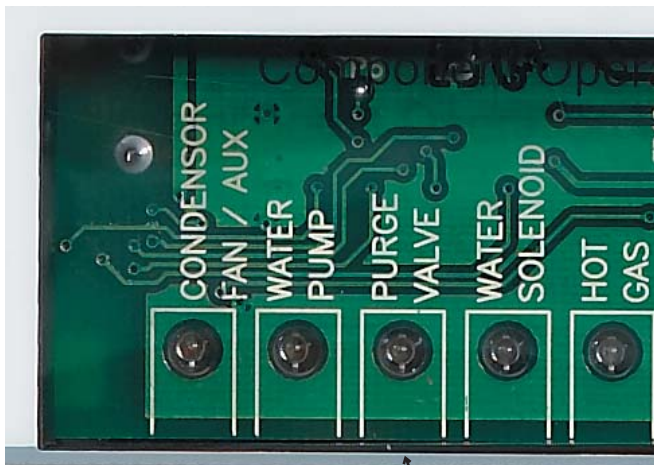
### Purge valve

1. Test using the controller's indicator lights. Shut unit off by holding the Off button for 3 seconds. Wait four minutes. Push and release the On button, observe the Purge Valve indicator light. As the unit drains the reservoir, the purge valve will be powered. When it gets power, the indicator light will be ON. If the purge valve does not open to drain the reservoir when its indicator light is on, do a voltage check. Shut the unit down by holding the Off button in for 3 seconds. Unplug the harness connection from the purge valve. Wait four minutes. Push and release the On button to restart the machine. As the unit drains the reservoir, the purge valve connection should receive full voltage. If it does, the purge valve should be replaced. If there is no voltage, check voltage from the controller to ground. The purge valve pin is 3 (dump valve on wiring diagram). If there is voltage from that pin to ground, but low voltage at the valve harness connection, the harness has a broken wire or poor connection and must be replaced. If the voltage to ground is low, the controller should be replaced.

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Note: The coil of this valve is internally rectified, and will normally show infinite resistance when tested with an ohmmeter.

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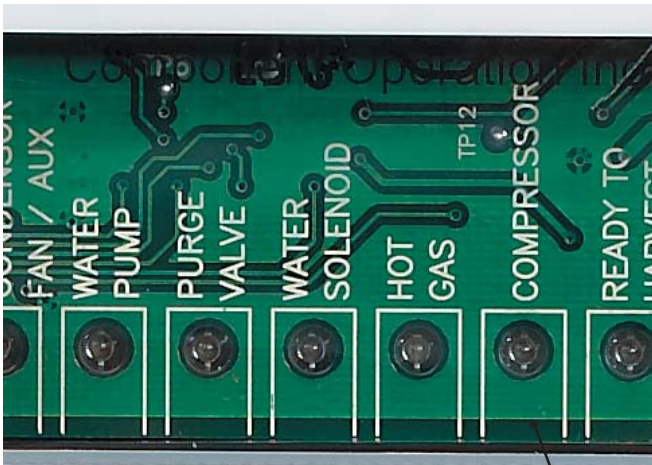
This light will be ON when the Purge Valve is in operation.

## Test Procedures - Loads

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### Compressor contactor

1. Test using the controller's indicator lights. When the unit is in ice making mode the compressor contactor will have power. Check the Compressor indicator light, when it is on the compressor contactor will have pulled in. If it is not, do a voltage check. Place voltmeter leads on the coil of the contactor. There should be full voltage. If there is full voltage present and the contactor has not pulled in, replace the contactor. If there is no voltage check if the high pressure cut out is open. If the high pressure cut out is closed, check for voltage from the controller to ground. The contactor pin is 4. Check from 4 to ground when the compressor indicator light is on. There should be voltage. If not, replace the controller. If there is voltage at the controller but not at the contactor coil, the harness wires or connectors are damaged and must be replaced.
2. Test using an ohmmeter. Test the coil of the contactor for continuity or shorts to ground. Replace if open or shorted.
3. Check connections and contacts. Be sure connections are tight and that the contacts are not burnt. Replace any contactor with burnt contacts.



This light will be ON when the compressor contactor is powered.

## Test Procedures - Loads

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### Pressure switches

There are two pressure switches: Fan and High Pressure cut out.

Fan. The fan pressure switch will open to shut the fan motor off at a certain pressure and re-close at a preset higher pressure.

High pressure cut out. The high pressure cut out switch will open at a preset pressure, shutting off power to the compressor contactor. After the pressure has fallen to another preset level, the switch will re-close and the contactor coil will be energized.

To Test Fan Pressure Switch:

- A. Attach refrigeration gauge set to high side port.
- B. Unplug both wires from fan pressure control. **Be SURE the wire's terminals are wrapped in electrical tape to prevent short circuits to ground during the test.**
- C. Connect ohmmeter to terminals of fan pressure control..
- D. Switch ice machine on, observe pressure that the pressure control closes at, compare to spec. Switch unit off, allow system to equalize, observe pressure the pressure control opens at, compare to spec.

To Test High Pressure Switch:

- A. Attach refrigeration gauge set to high side port.
- B. Unplug fan motor or shut water off if water cooled.
- C. Measure voltage between contactor side terminal of high pressure control and ground.
- D. Switch ice machine on, observe pressure that the pressure control opens at, compare to spec. Allow system to equalize, observe the pressure that the pressure control closes at, compare to spec.

### Transformer

Check secondary voltage, it must be between 10 and 15.5 AC volts. Replace if no voltage is output or if above or below the acceptable voltage..

### Controller

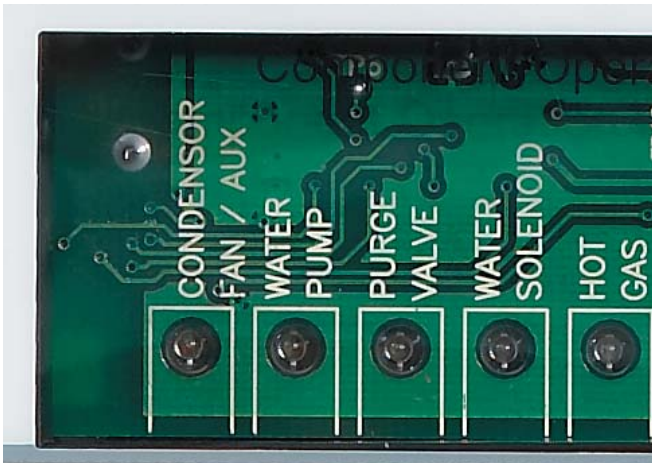
The controller's software operation is confirmed if it is functioning. Execute the test to confirm its operation of the loads. Illumination of a diagnostic code (other than E) is not an indication of controller failure. Each code requires its own diagnosis.

## Test Procedures - Loads

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### Liquid Line Solenoid (remote only)

1. Test using the controller's indicator lights. Put the controller into test mode (depress Off for 3 seconds then depress Clean for 3 seconds). At the end of the test cycle, the liquid line valve will be powered and the Condenser Fan motor indicator light will be on. The liquid line valve should be open at that time. If it is not, repeat the test but check the voltage to the liquid line valve coil, it must receive full voltage at the liquid line lead connection at the end of the test. If there is voltage and the valve does not operate, replace the valve coil. If there is no voltage, check the controller high voltage harness connection. The liquid line solenoid lead is the top wire. Check voltage from it to ground, at the end of the test, when the Condenser Fan indicator light is On, there must be voltage from this pin to ground. Note: high voltage power is supplied to the bottom pin from the contactor line. Refer to the machine wiring diagram as needed.
2. Test using an ohmmeter. Disconnect electrical power. Unplug liquid line coil from harness. Measure liquid line coil resistance. If open, replace the liquid line valve coil.



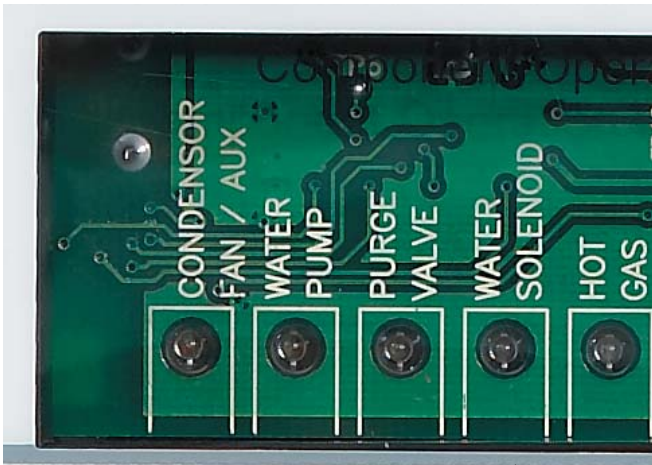
This light will be ON when the liquid line solenoid has power.

## Test Procedures - Loads

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### Inlet Water Solenoid Valve

1. Test using the controller's indicator lights. Shut unit off by holding the Off button for 3 seconds. Wait four minutes. Push and release the On button, observe the Water Solenoid indicator light. After the unit drains the reservoir, the inlet water valve will be powered to refill the reservoir. When it gets power, the indicator light will be ON. If the water valve does not open to fill the reservoir when its indicator light is on, do a voltage check. Shut the unit down by holding the Off button in for 3 seconds. Unplug the harness connection from the inlet water valve. Wait four minutes. Push and release the On button to restart the machine. After the unit drains the reservoir, the inlet water valve connection should receive full voltage. If it does, the inlet water valve should be replaced. If there is no voltage, check voltage from the controller to ground. The inlet water solenoid valve pin is 7. If there is voltage from that pin to ground, but low voltage at the valve harness connection, the harness has a broken wire or poor connection and must be replaced. If the voltage to ground is low, the controller should be replaced.
2. Test using an ohmmeter. Disconnect electrical power. Unplug coil from harness. Measure coil resistance. If open, replace the inlet water solenoid.



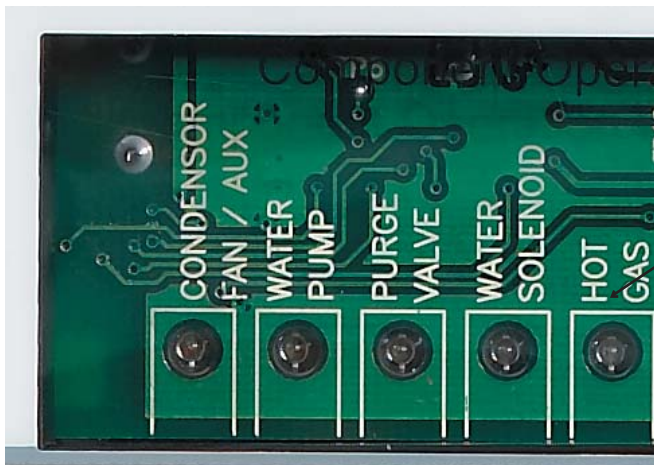
Light is ON when inlet water solenoid is in operation.

## Test Procedures - Loads

### Harvest assist solenoid

1. Test using the controller's indicator lights. Push and release the Harvest button. The Hot Gas indicator light will be on. At the same time the Harvest Assist Solenoid will be powered. If the ice on the evaporator is thin, the solenoid will extend. If the ice is nearly full sized, the solenoid will press against the ice until it releases from the evaporator, then the solenoid probe will extend. If the probe extends, the solenoid is good. If not, do a voltage check. Unplug the high voltage harness from the harvest assist solenoid. Attach a voltmeter to the harness connector. Push and release the Harvest button. There should be full voltage at the connector. If there is and the solenoid does not extend, replace the solenoid. If full voltage is not present, check voltage at the controller. If there is no voltage, check voltage from the controller to ground. The hot gas / harvest assist pin is 5. If there is voltage from that pin to ground, but low voltage at the solenoid harness connection, the harness has a broken wire or poor connection and must be replaced. If the voltage to ground is low, the controller should be replaced.

Note: The coil of this valve is internally rectified, will normally show infinite resistance when tested with an ohmmeter.



This light will be ON during harvest. Both the Hot Gas Valve coil and the Harvest assist solenoid coil will have power when this light is ON.

### Hot Gas or Vapor Valve

1. Test using the controller's indicator lights. If the unit is running, or has been off for more than 4 minutes, push and release the Harvest button. The Hot Gas indicator light will be on

and the hot gas valve will be energized. The compressor will force discharge gas into the evaporator inlet, warming it. If the evaporator inlet does not warm up, do a voltage check. Shut the unit off by holding the Off button in for 3 seconds. Unplug the high voltage harness from the hot gas solenoid. Attach a voltmeter to the harness connector. Wait 4 minutes. Push and release the Harvest button. There should be full voltage at the connector. If there is and the solenoid does not open, replace the solenoid coil. If full voltage is not present, check voltage at the controller. If there is no voltage, check voltage from the controller to ground. The hot gas pin is 5. If there is voltage from that pin to ground, but low voltage at the solenoid harness connection, the harness has a broken wire or poor connection and must be replaced. If the voltage to ground is low, the controller should be replaced.

2. Test with an ohmmeter. Disconnect electrical power. Unplug high voltage harness from hot gas or vapor valve. Measure resistance of hot gas or vapor valve coil. If open, replace the coil.



## Technical Information

### Pressure Switches Cut In, Cut Out

	Cut In (PSIG)	Cut Out (PSIG)
Fan Pressure Control, 22" and 30"	240	190
Fan Pressure Control, 48"	280	220
High Pressure Cut Out AC	390	500
High Pressure Cut Out WC	300	400
High Pressure Cut Out, Remote	350	450

### Compressor Amp Draws

	Voltage	Brand	Base Model	Freeze	Harvest
C0322	115	Tecumseh	AKA9438	7.3-4.8	6.2
	230		same		
C0522	115		AKA9451	7.9-6.5	7.2
	230		same		
C0330	115		AKA9438	6.2-4.8	5.7
	230		same		
C0530 A or B	115	Copeland	AKA9451	8-6.5	9.3
	230		same		
C0530 C	115	Copeland	RST45	6.9-5.5	6.6-7.0
	230		RST45		
C0630	230	Tecumseh	AJA7490	5.8-5.0	6.8
C0830	single phase	Copeland	CS10	6.4-5.3	6.6
	three phase		same		
C1030	single phase		CS12	7.3-4.8	6.2
	three phase		same		
C1448	single phase		CS14	12.5-7.6	9.2
	three phase		same		
C1848	single phase		CS20	16-10	15
	three phase		same		
C2148 W	single phase		CS24	15.4-12.6	16.2
	three phase		same		
C2148R	single phase		CS27		
	three phase		same		

## Heat Load & Condenser Water GPM

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Air Cooled - Average heat load for air conditioning unit sizing

Model	BTUH
C0322	4000
C0522	6800
C0330	4000
C0530	6800
C0630	8800
C0803	10800
C1030	12000
C1448	17200
C1848	22000

Water Cooled Water Use - condenser only,

Model	GPM, 45°F. water inlet temp	GPM, 70°F. water inlet temp
C0322	.2	.3
C0522	.3	.7
C0330	.1	.3
C0530	.3	.5
C0630	.4	.7
C0803	.4	.8
C1030	.4	1.0
C1448	.6	1.1
C1848	1.0	1.8
C2148	1.0	2.0

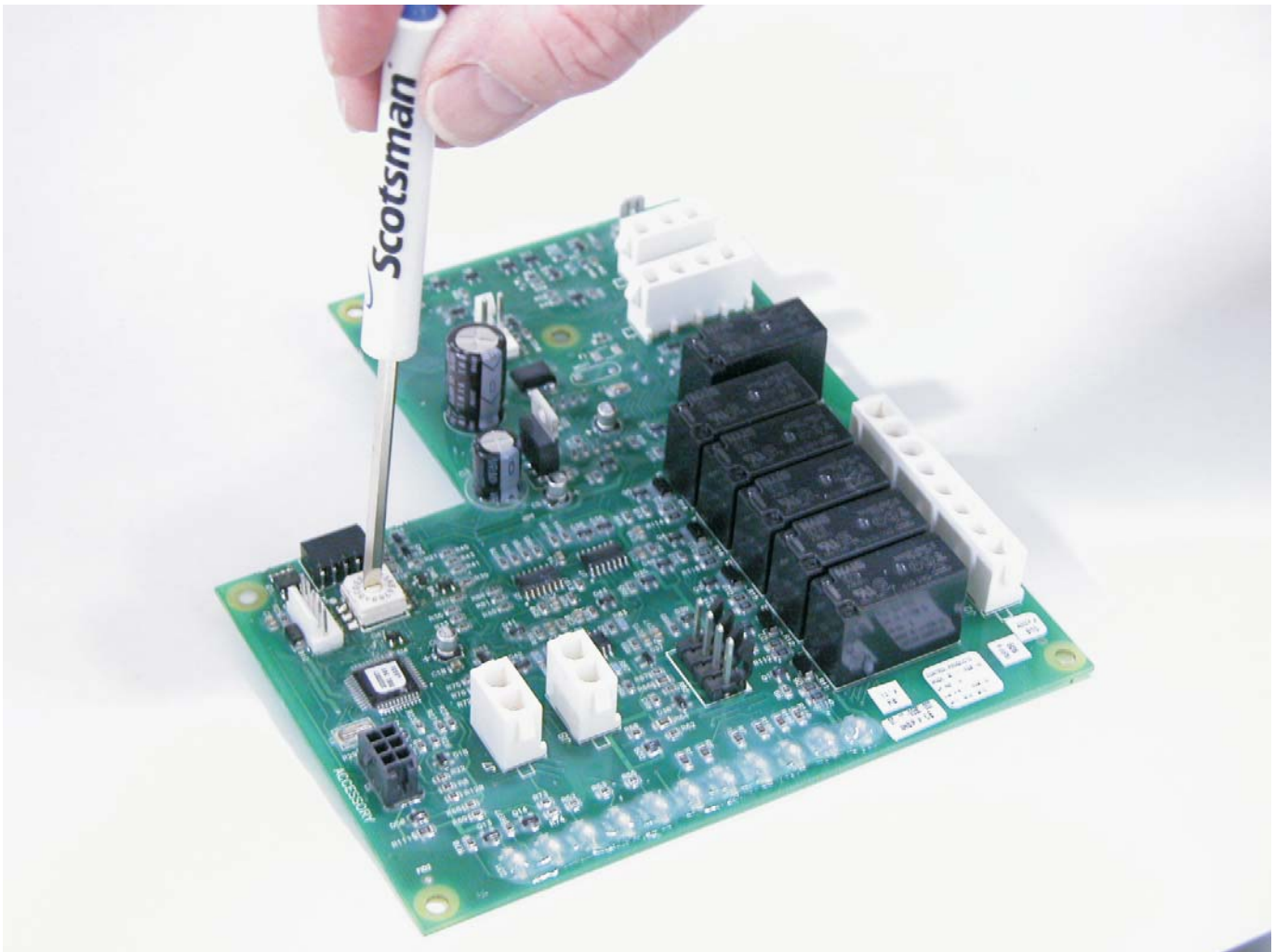
## Controller Differences

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The controllers are programmed at the factory for the model they are installed on, they cannot be moved from one model to another due to differences in:

- Water purge time per setting
- Maximum harvest time
- Number of evaporator plates

The service controller has a selector switch that allows it to be used as a replacement part in any of the Prodigy models in production at the time the controller was manufactured. As new Prodigy models are introduced, those models will be added to the list of models new service controllers will work with.



The Service Controller includes a selector switch. The switch must be set to the model the controller is being installed on. As new models are introduced, their setting will be added to service controllers produced after that point.

# Thermistor Values

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Deg. F. . Ohms	Deg. F. . Ohms	Deg. F. . Ohms	Deg. F. . Ohms	Deg. F. . Ohms
0..... 85325	52..... 18873	104.... 5325	156.... 1819	208.... 724
1..... 82661	53..... 18381	105.... 5208	157.... 1785	209.... 713
2..... 80090	54..... 17903	106.... 5093	158.... 1752	210.... 701
3..... 77607	55..... 17439	107.... 4981	159.... 1719	211.... 690
4..... 75210	56..... 16988	108.... 4872	160.... 1687	212.... 679
5..... 72896	57..... 16551	109.... 4766	161.... 1655	213.... 668
6..... 70660	58..... 16126	110.... 4663	162.... 1624	214.... 657
7..... 68501	59..... 15714	111.... 4562	163.... 1594	215.... 646
8..... 66415	60..... 15313	112.... 4463	164.... 1565	216.... 636
9..... 64400	61..... 14924	113.... 4367	165.... 1536	217.... 626
10.... 62453	62..... 14546	114.... 4273	166.... 1508	218.... 616
11.... 60571	63..... 14179	115.... 4182	167.... 1480	219.... 606
12.... 58752	64..... 13823	116.... 4093	168.... 1453.	220.... 597
13.... 56995	65..... 13476	117.... 4006	169.... 1427	221.... 587
14.... 55296	66..... 13139	118.... 3921	170.... 1401	222.... 578
15.... 53653	67..... 12812	119.... 3838	171.... 1375	223.... 569
16.... 52065	68..... 12494	120.... 3757	172.... 1350	224.... 560
17.... 50529	69..... 12185	121.... 3678	173.... 1326	225.... 551
18.... 49043	70..... 11884	122.... 3601	174.... 1302	226.... 543
19.... 47607	71..... 11592	123.... 3526	175.... 1279	227.... 534
20.... 46217	72..... 11308	124.... 3452	176.... 1256	228.... 526
21.... 44872	73..... 11031	125.... 3381	177.... 1234	229.... 518
22.... 43571	74..... 10763	126.... 3311	178.... 1212	230.... 510
23.... 42313	75..... 10502	127.... 3243	179.... 1190	231.... 502
24.... 41094	76..... 10247	128.... 3176	180.... 1169	232.... 495
25.... 39915	77..... 10000	129.... 3111	181.... 1149	233.... 487
26.... 38774	78..... 9760	130.... 3047	182.... 1129	234.... 480
27.... 37669	79..... 9526	131.... 2985	183.... 1109	235.... 472
28.... 36600	80..... 9299	132.... 2924	184.... 1090	236.... 465
29.... 35564	81..... 9077	133.... 2865	185.... 1071	237.... 458
30.... 34561	82..... 8862	134.... 2807	186.... 1052	238.... 451
31.... 33590	83..... 8652	135.... 2751	187.... 1034	239.... 444
32.... 32649	84..... 8448	136.... 2696	188.... 1016	240.... 438
33.... 31738	85..... 8250	137.... 2642	189.... 998	241.... 431
34.... 30855	86..... 8056	138.... 2589	190.... 981	242.... 425
35.... 30000	87..... 7868	139.... 2537	191.... 965	243.... 419
36.... 29171	88..... 7685	140.... 2487	192.... 948	244.... 412
37.... 28368	89..... 7507	141.... 2438	193.... 932	245.... 406
38.... 27589	90..... 7333	142.... 2390	194.... 916	246.... 400
39.... 26835	91..... 7164	143.... 2343	195.... 901	247.... 394
40.... 26104	92..... 6999	144.... 2297	196.... 885	248.... 389
41.... 25395	93..... 6839	145.... 2252	197.... 871	249.... 383
42.... 24707	94.... 6683	146.... 2208	198.... 856	250.... 377
43.... 24041	95.... 6530	147.... 2165	199.... 842	
44.... 23394	96.... 6382	148.... 2123	200.... 828	
45.... 22767	97.... 6238	149.... 2082	201.... 814	
46.... 22159	98.... 6097	150.... 2042	202.... 800	
47.... 21569	99.... 5960	151.... 2003	203.... 787	
48.... 20997	100... 5826	152.... 1965	204.... 774	
49.... 20442	101... 5696	153.... 1927	205.... 761	
50.... 19903	102... 5569	154.... 1890	206.... 749	
51.... 19381	103... 5446	155.... 1855	207.... 737	

## Performance Data

C0322A

		Ambient Air Temp., Degrees F.		
		70	80	90
Cycle Time (minutes)	Water Temp			
	50	10-12	12-13	13-14
	70	11-12	13-14	14-16
	80	12-13	14+	15-16
	90	13-14	14-15	16-17
Suction Pressure (PSIG)	End of Freeze	26		32
	Harvest	105		130
Discharge Pressure (PSIG)	End of Freeze	235		250
	Harvest	150		200

C0322W

		Ambient Air Temp., Degrees F.		
		70	80	90
Cycle Time (minutes)	Water Temp			
	50	9-11	11+	10-11
	70	11+	12+	10-12
	80	12+	13+	12-13
	90	12-13	13-14	13+
Suction Pressure (PSIG)	End of Freeze	32		32
	Harvest	95-100		100-110
Discharge Pressure (PSIG)	End of Freeze	245		245
	Harvest	140		150

Ice per cycle weight: 2-4 to 2.6 lb.

## Performance Data

C0522A

		Ambient Air Temp., Degrees F.		
		70	80	90
Cycle Time (minutes)	Water Temp			
	50	11-13	13	16
	70	13	14	16-18
	80	14	15	18
	90	15	16	19
Suction Pressure (PSIG)	End of Freeze	32		34
	Harvest	105		120
Discharge Pressure (PSIG)	End of Freeze	228		270
	Harvest	180		210

C0522W

		Ambient Air Temp., Degrees F.		
		70	80	90
Cycle Time (minutes)	Water Temp			
	50	13-15	15	14
	70	15	16	14-15
	80	16	17	15
	90	16-17	17	16
Suction Pressure (PSIG)	End of Freeze	23		36
	Harvest	85		110
Discharge Pressure (PSIG)	End of Freeze	235		245
	Harvest	115		200

Ice per cycle weight: 4.5 to 5 lb.

## Performance Data

C0330A

		Ambient Air Temp., Degrees F.		
		70	80	90
Cycle Time (minutes)	Water Temp			
	50	9-10	10-11	11-12
	70	10-11	11-12	12-13
	80	11-12	12-13	13-14
	90	12-13	13-14	14-15
Suction Pressure (PSIG)	End of Freeze	28		
	Harvest	110		
Discharge Pressure (PSIG)	End of Freeze	200		
	Harvest	150		

C0330W

		Ambient Air Temp., Degrees F.		
		70	80	90
Cycle Time (minutes)	Water Temp			
	50	8-10	10	10
	70	10	11	10-11
	80	11	11	11
	90	11	11	12
Suction Pressure (PSIG)	End of Freeze	33		35
	Harvest	95		110
Discharge Pressure (PSIG)	End of Freeze	235		235
	Harvest	130		150

Ice per cycle weight: 2.4 to 2.6 lb

## Performance Data

C0530A

		Ambient Air Temp., Degrees F.		
		70	80	90
Cycle Time (minutes)	Water Temp			
	50	13	14	16
	70	14	15	17
	80	15	16	18
	90	16	17	19
Suction Pressure (PSIG)	End of Freeze	33		32
	Harvest	95		105
Discharge Pressure (PSIG)	End of Freeze	230		260
	Harvest	130		190

C0530W

		Ambient Air Temp., Degrees F.		
		70	80	90
Cycle Time (minutes)	Water Temp			
	50	10	12	12
	70	11	13	13
	80	12	13	13
	90	13	13	14
Suction Pressure (PSIG)	End of Freeze	33		34
	Harvest	100		110
Discharge Pressure (PSIG)	End of Freeze	235		235
	Harvest	140		150

Ice per cycle weight: 4.5 to 5 lb



## Performance Data

C0630A

		Ambient Air Temp., Degrees F.		
		70	80	90
Cycle Time (minutes)	Water Temp			
	50	9-10	10-11	10-11
	70	10-11	11-12	11-12
	80	11-12	12-13	12-13
	90	12-13	13-14	13-14
Suction Pressure (PSIG)	End of Freeze	21		27
	Harvest	85		115
Discharge Pressure (PSIG)	End of Freeze	200		255
	Harvest	160		200

C0630W

		Ambient Air Temp., Degrees F.		
		70	80	90
Cycle Time (minutes)	Water Temp			
	50	9	10	10
	70	10	11	11
	80	11	11	12
	90	11	11	13
Suction Pressure (PSIG)	End of Freeze	25		22
	Harvest	75		80
Discharge Pressure (PSIG)	End of Freeze	235		235
	Harvest	140		155

Ice per cycle weight: 4.5 to 5 lb

## Performance Data

C0830A

		Ambient Air Temp., Degrees F.		
		70	80	90
Cycle Time (minutes)	Water Temp			
	50	11	12	13
	70	12	13	14
	80	13	14	15
	90	14	15	16
Suction Pressure (PSIG)	End of Freeze	26		30
	Harvest	80		100
Discharge Pressure (PSIG)	End of Freeze	204		260
	Harvest	160		195

C0830W

		Ambient Air Temp., Degrees F.		
		70	80	90
Cycle Time (minutes)	Water Temp			
	50	11	12-13	13
	70	12	13-14	13
	80	13	13-14	14
	90	14	14	15
Suction Pressure (PSIG)	End of Freeze	30		31
	Harvest	85		90
Discharge Pressure (PSIG)	End of Freeze	235		237
	Harvest	175		178

Ice per cycle weight: 7 - 7.3 lb

## Performance Data

C1030A

		Ambient Air Temp., Degrees F.		
		70	80	90
Cycle Time (minutes)	Water Temp			
	50	9-10	10-11	11-12
	70	10-11	11-12	12-13
	80	11-12	12-13	13
	90	10-13	13-14	14-15
Suction Pressure (PSIG)	End of Freeze	26		30
	Harvest	80		90
Discharge Pressure (PSIG)	End of Freeze	210		260
	Harvest	165		190

C1030W

		Ambient Air Temp., Degrees F.		
		70	80	90
Cycle Time (minutes)	Water Temp			
	50	10	11	11
	70	11	11-12	11
	80	11-12	12	12
	90	12	12-13	13
Suction Pressure (PSIG)	End of Freeze	26		30
	Harvest	70		75
Discharge Pressure (PSIG)	End of Freeze	240		240
	Harvest	145		155

Ice per cycle weight: 7 - 7.3 lb

## Performance Data

C1448A

		Ambient Air Temp., Degrees F.		
		70	80	90
Cycle Time (minutes)	Water Temp			
	50	12-13	13-14	14-15
	70	13-14	14-15	15-16
	80	14-15	15-16	16-17
	90	15-16	16-17	17-18
Suction Pressure (PSIG)	End of Freeze	38		40
	Harvest	100		100
Discharge Pressure (PSIG)	End of Freeze	250		270
	Harvest	150		160

C1448W

		Ambient Air Temp., Degrees F.		
		70	80	90
Cycle Time (minutes)	Water Temp			
	50	13-14	14-15	15-16
	70	14-15	15-16	15-16
	80	15-16	15-16	16-17
	90	15-16	15-16	17-18
Suction Pressure (PSIG)	End of Freeze	36		35
	Harvest	105		100
Discharge Pressure (PSIG)	End of Freeze	235		235
	Harvest	170		165

## Performance Data

C1848A

		Ambient Air Temp., Degrees F.		
		70	80	90
Cycle Time (minutes)	Water Temp			
	50	10-11	11-12	12-13
	70	11-12	12-13	13-14
	80	12-13	13-14	14-15
	90	13-14	14-15	15-16
Suction Pressure (PSIG)	End of Freeze	30		32
	Harvest	90		100
Discharge Pressure (PSIG)	End of Freeze	227		285
	Harvest	170		195

C1848A

		Ambient Air Temp., Degrees F.		
		70	80	90
Cycle Time (minutes)	50	10-11	11-12	11-12
	70	11-12	12-13	11-12
	80	12-13	12-13	12-13
	90	12-13	12-13	13-14
Suction Pressure (PSIG)	End of Freeze	30		30
	Harvest	80		85
Discharge Pressure (PSIG)	End of Freeze	240		240
	Harvest	155		165

14 lb / cycle.

## Performance Data

---

C2148W

		Ambient Air Temp., Degrees F.		
		70	80	90
Cycle Time (minutes)	Water Temp			
	50	9-10	10-11	11
	70	10-11	11-12	11
	80	11-12	11-12	12
	90	11-12	11-12	13
Suction Pressure (PSIG)	End of Freeze	27		27
	Harvest	75		75
Discharge Pressure (PSIG)	End of Freeze	235		240
	Harvest	160		160

Ice weight per cycle: 14.2

## Performance Data - Remotes

C0522R

		Condenser Intake Air Temp., Degrees F.				
		-20	70	80	90	120
Cycle Time (minutes)	Water Temp	10				
	50		12-13	13-14	14	
	70		13-14	13-14	14-15	
	80		14-15	14-15	15-16	
	90		15-16	17-18	18-19	23
Suction Pressure (PSIG)	End of Freeze		35		35	
	Harvest		85		90	
Discharge Pressure (PSIG)	End of Freeze	Min 205	230		245	Peak at 360
	Harvest		215		225	

Ice per cycle, 4.4 to 4.6 lb

## Performance Data - Remotes

C0530R

		Condenser Intake Air Temp., Degrees F.				
		-20	70	80	90	120
Cycle Time (minutes)	Water Temp					
	50	10	11-13	13-14	13-14	
	70		14	14-15	14	
	80		15	15-16	15-16	
	90		16	17-18	17-18	27
Suction Pressure (PSIG)	End of Freeze Harvest		30 145		35 100	
Discharge Pressure (PSIG)	End of Freeze Harvest	207 min	230 200		245 220	Peaks at 350



## Performance Data - Remotes

C0630R

		Condenser Intake Air Temp., Degrees F.				
		-20	70	80	90	120
Cycle Time (minutes)	Water Temp					
	50	7-8	9	9	9-10	
	70		9-10	9-10	10	
	80		10-11	11-12	11	
	90		12	14	13-14	16-17
Suction Pressure (PSIG)	End of Freeze		30		30	
	Harvest		110		120	
Discharge Pressure (PSIG)	End of Freeze		240		245	
	Harvest	Min 204	200		220	Peaks at 370

## Performance Data - Remotes

C0830R

		Condenser Intake Air Temp., Degrees F.				
		-20	70	80	90	120
Cycle Time (minutes)	Water Temp					
	50	8-9	9-11	10-11	12	
	70		11	11-12	13	
	80		12-13	12-13	13-14	
	90		13-14	15	16-17	21-22
Suction Pressure (PSIG)	End of Freeze		32		32	
	Harvest		100		110	
Discharge Pressure (PSIG)	End of Freeze	Min at	240		245	Peak at
	Harvest	205	200		210	360

## Performance Data - Remotes

C1030R

		Condenser Intake Air Temp., Degrees F.				
		-20	70	80	90	120
Cycle Time (minutes)	Water Temp					
	50	9	10-11	11	12-13	
	70		11	11-12	12-13	
	80		12-13	12-13	14	
	90		13-14	15-16	16-17	20-21
Suction Pressure (PSIG)	End of Freeze		28		27	
	Harvest		95		100	
Discharge Pressure (PSIG)	End of Freeze	Min 207	230		240	Peaks at 380
	Harvest		200		215	

## Performance Data - Remotes

C1448R

		Condenser Intake Air Temp., Degrees F.				
		-20	70	80	90	+120
Cycle Time (minutes)	Water Temp					
	50	9	11	11-12	14-15	
	70		11-12	11-12	14-15	
	80		13	13	16	
	90		14	15-16	18-19	22
Suction Pressure (PSIG)	End of Freeze		40		40	
	Harvest		100		125	
Discharge Pressure (PSIG)	End of Freeze	Min 207	240		270	Peak at 405
	Harvest		150		200	

Ice per cycle, 12 lb.

## Performance Data - Remotes

---

C1848R

		Condenser Intake Air Temp., Degrees F.				
		-20	70	80	90	120
Cycle Time (minutes)	Water Temp					
	50	9	10-11	11-12	13	
	70		11-12	12	13	
	80		13	13-14	14-15	
	90		14	16	17	19
Suction Pressure (PSIG)	End of Freeze		32		33	
	Harvest		85		105	
Discharge Pressure (PSIG)	End of Freeze	Min 210	240		245	Peak at 370
	Harvest		170		205	

Ice per cycle 14 lb.

## Performance Data - Remotes

---

C2148R

		Condenser Intake Air Temp., Degrees F				
		-20	70	80	90	120
Cycle Time (minutes)	Water Temp					
	50	9	10	10	11	
	70		9-10	10	12	
	80		11-12	11	13	
	90		12-13	14	15-16	18-19
Suction Pressure (PSIG)	End of Freeze		24		24	
	Harvest		80		95	
Discharge Pressure (PSIG)	End of Freeze	Min 217	240		250	Peaks at 410
	Harvest		190		220	

Ice per cycle, 14-15 lb.

# Wiring Diagrams

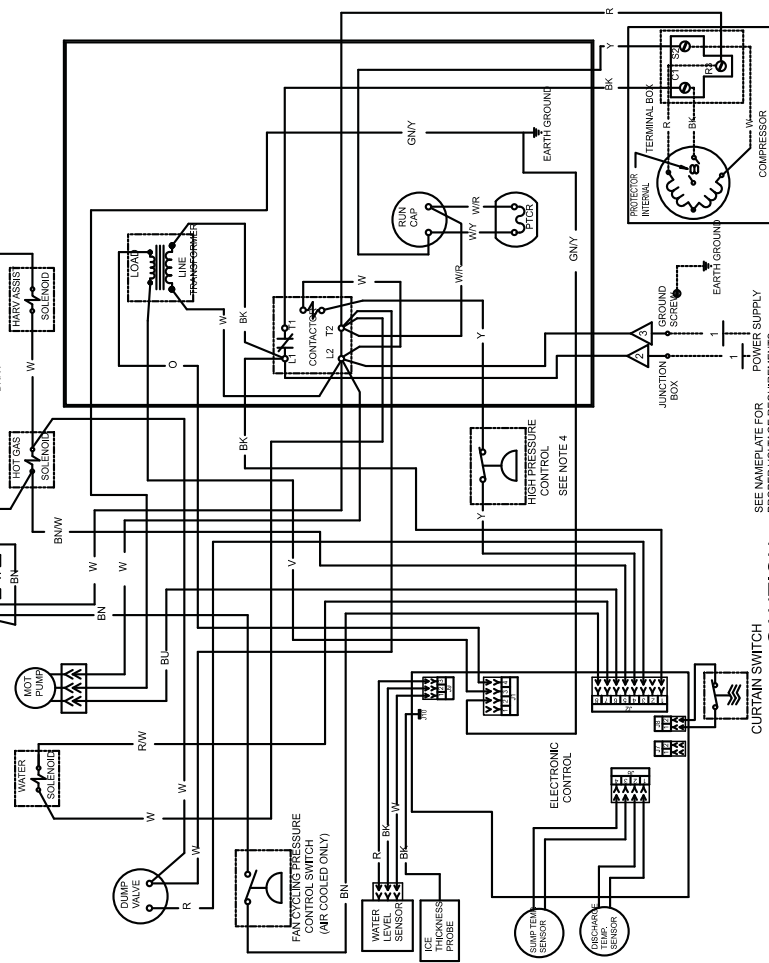
C0322, C0522, C0330, C0530, C0630, C0830, C1030 - Single Phase

- ▲ DASHED LINES INDICATE FIELD WIRING WHICH MUST BE INSTALLED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE AND ALL STATE AND LOCAL CODES.
- ▲ WIRE COLOR FOR 206-230/60/1 AND 115/60/1 UNITS: BLACK
- ▲ WIRE COLOR FOR 115/60/1 UNITS: WHITE
- ▲ WIRE COLOR FOR 206-230/60/1 UNITS: BLACK/W/WHITE STRIPE
- ▲ HIGH PRESSURE CONTROL USED ON VC UNITS & AC C022, C042, C0320, C0530, C0630

**USE COPPER CONDUCTORS ONLY**

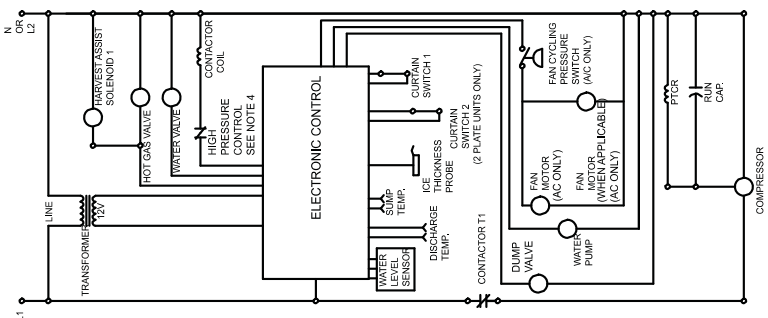
**CAUTION: PTCR WILL BE HOT. COMPRESSOR MAY NOT START IF PTCR IS NOT ALLOWED TO COOL**

17-3053-01



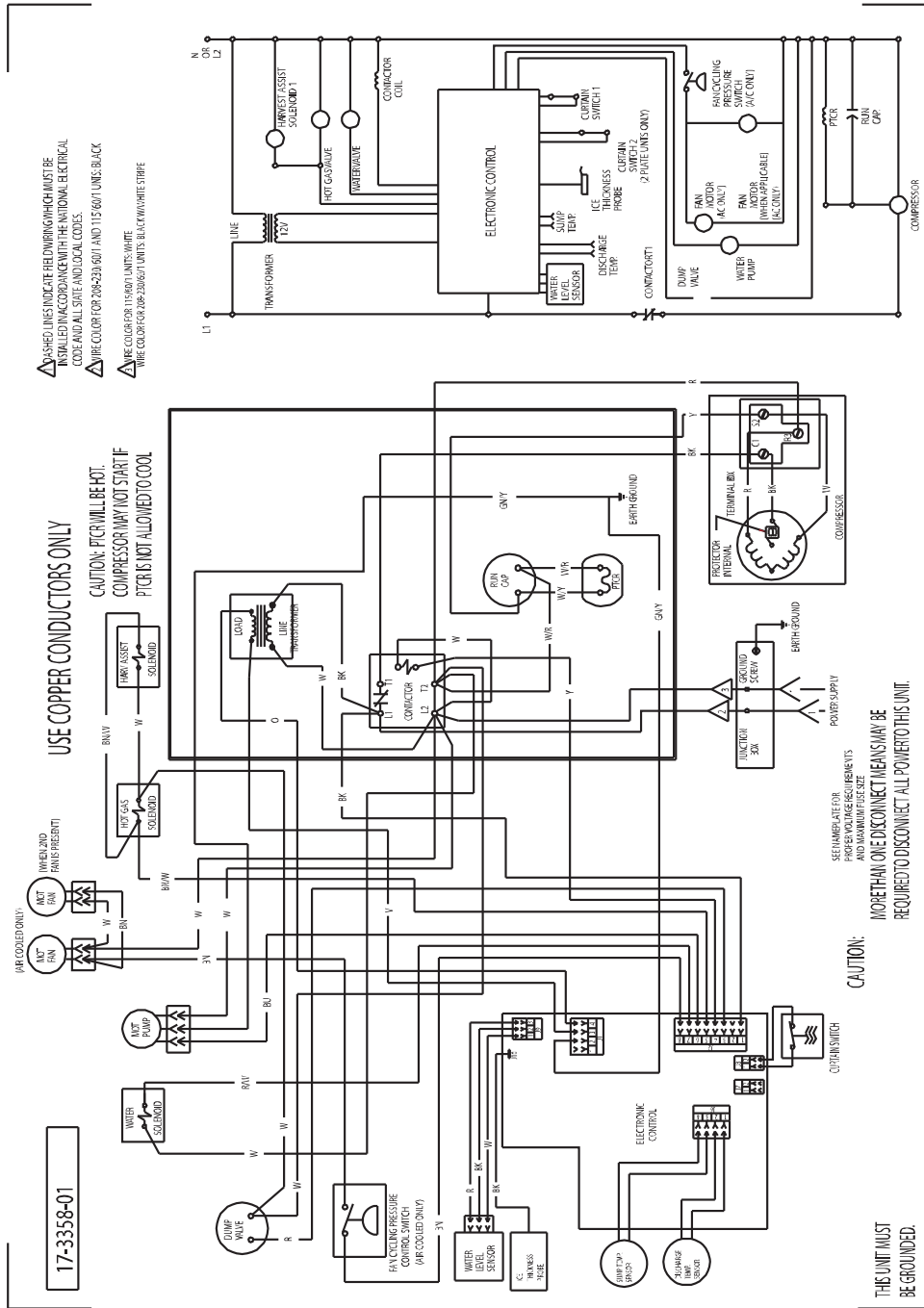
**CAUTION:** SEE NAMEPLATE FOR PROPER VOLTAGE REQUIREMENTS AND MAXIMUM FUSE SIZE. MORE THAN ONE DISCONNECT MEANS MAY BE REQUIRED TO DISCONNECT ALL POWER TO THIS UNIT.

**THIS UNIT MUST BE GROUNDED.**



# Wiring Diagrams

## C0530 C Air or Water Cooled 60 Hz

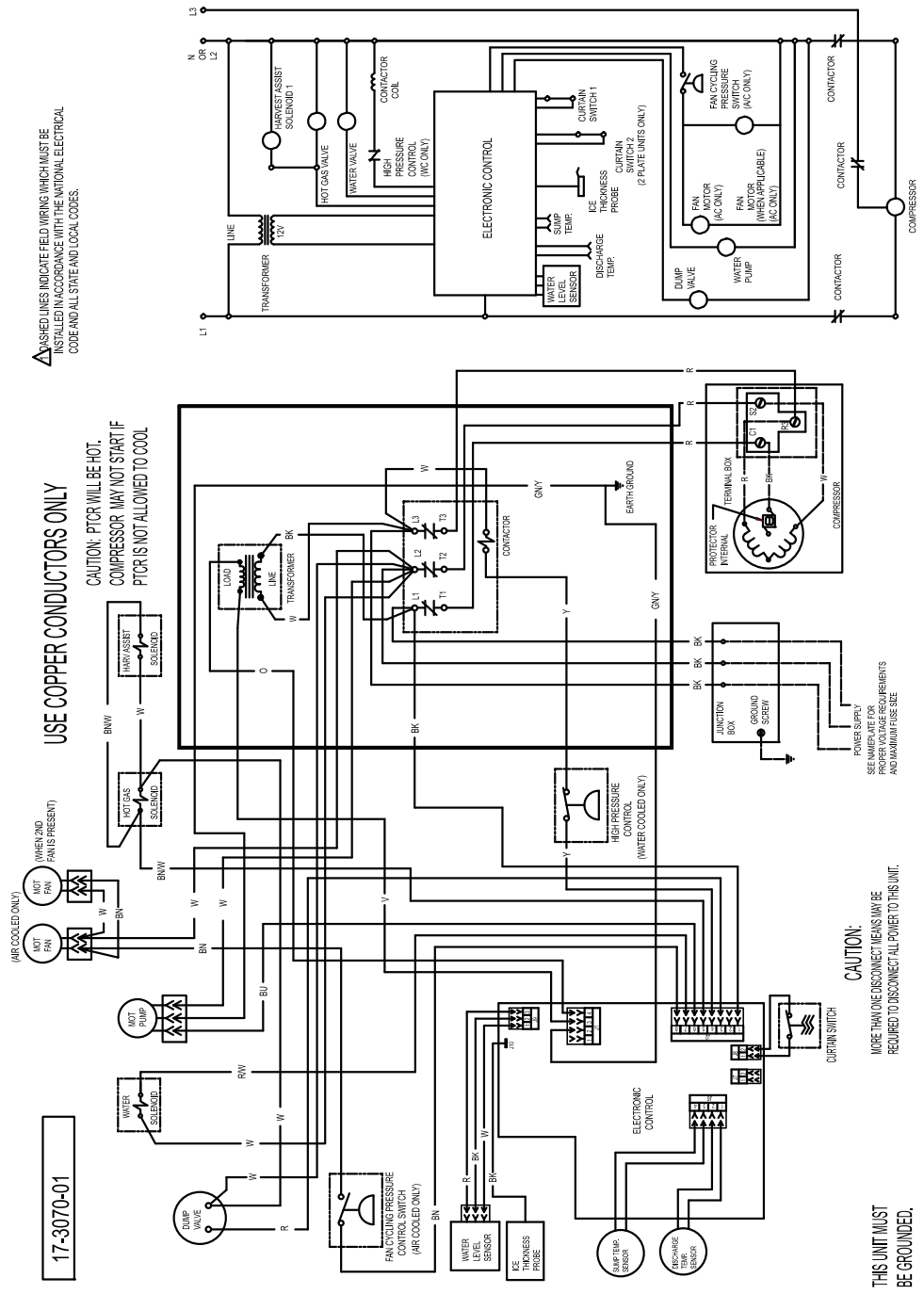




# Wiring Diagram

C0830, C1030 - Three Phase

**△** DASHED LINES INDICATE FIELD WIRING WHICH MUST BE INSTALLED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE AND ALL STATE AND LOCAL CODES.



**USE COPPER CONDUCTORS ONLY**

**CAUTION: PTCR WILL BE HOT. COMPRESSOR MAY NOT START IF PTCR IS NOT ALLOWED TO COOL.**

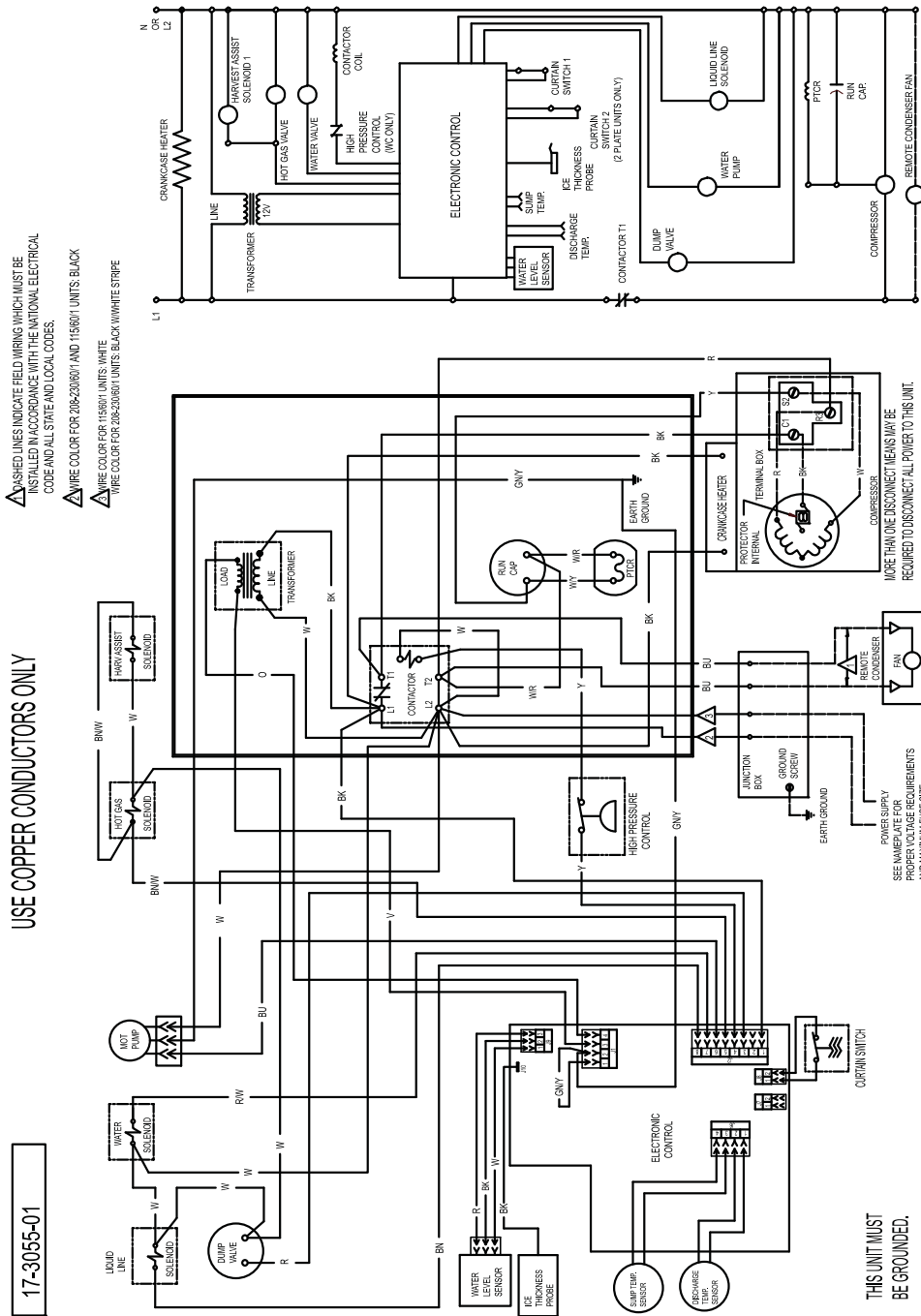
17-3070-01

**CAUTION:**  
MORE THAN ONE DISCONNECT MEANS MAY BE REQUIRED TO DISCONNECT ALL POWER TO THIS UNIT.

**THIS UNIT MUST BE GROUNDING.**

# Wiring Diagram

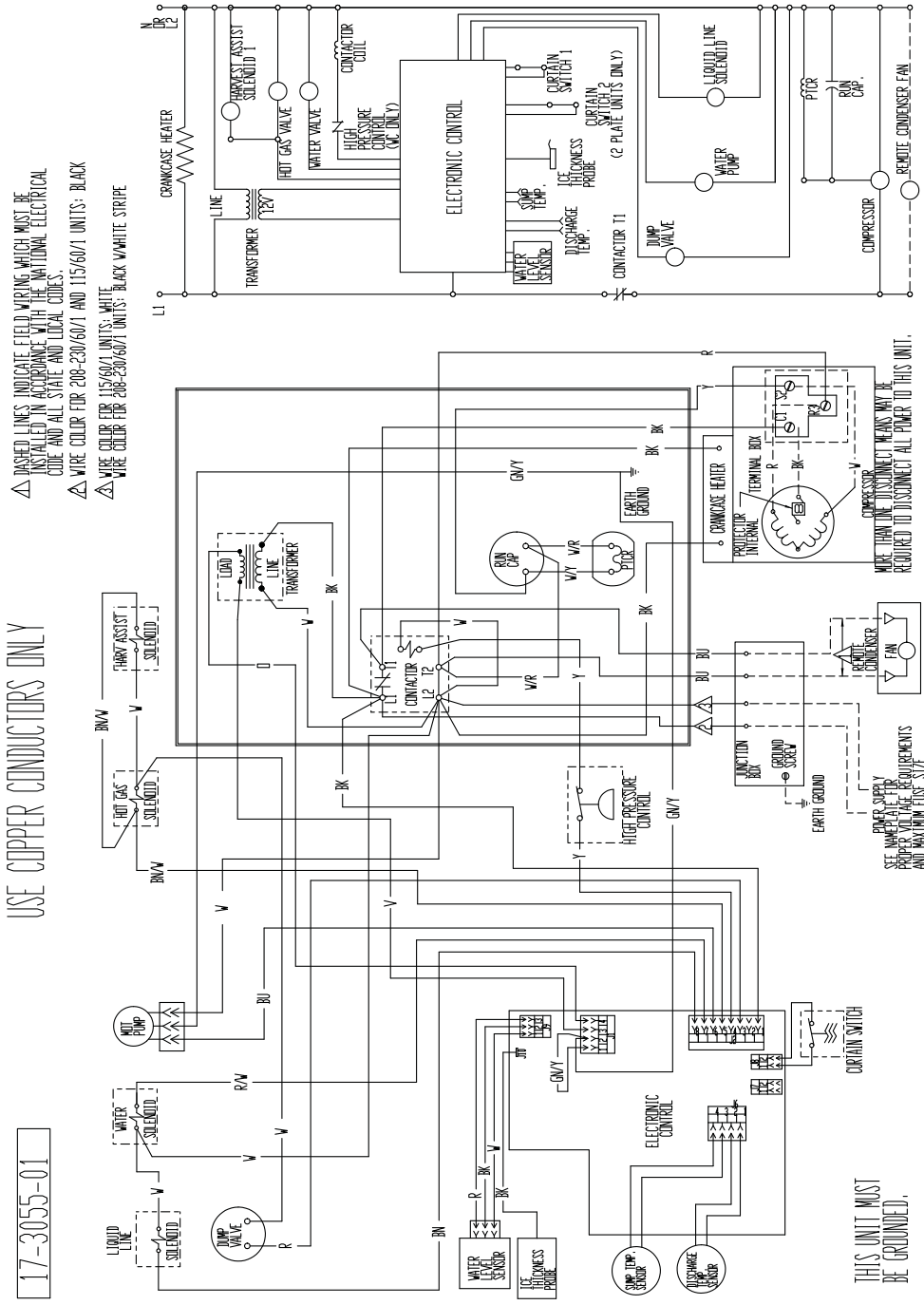
C0522R, C0530R, C0630R, C0830R, C1030R - Single Phase





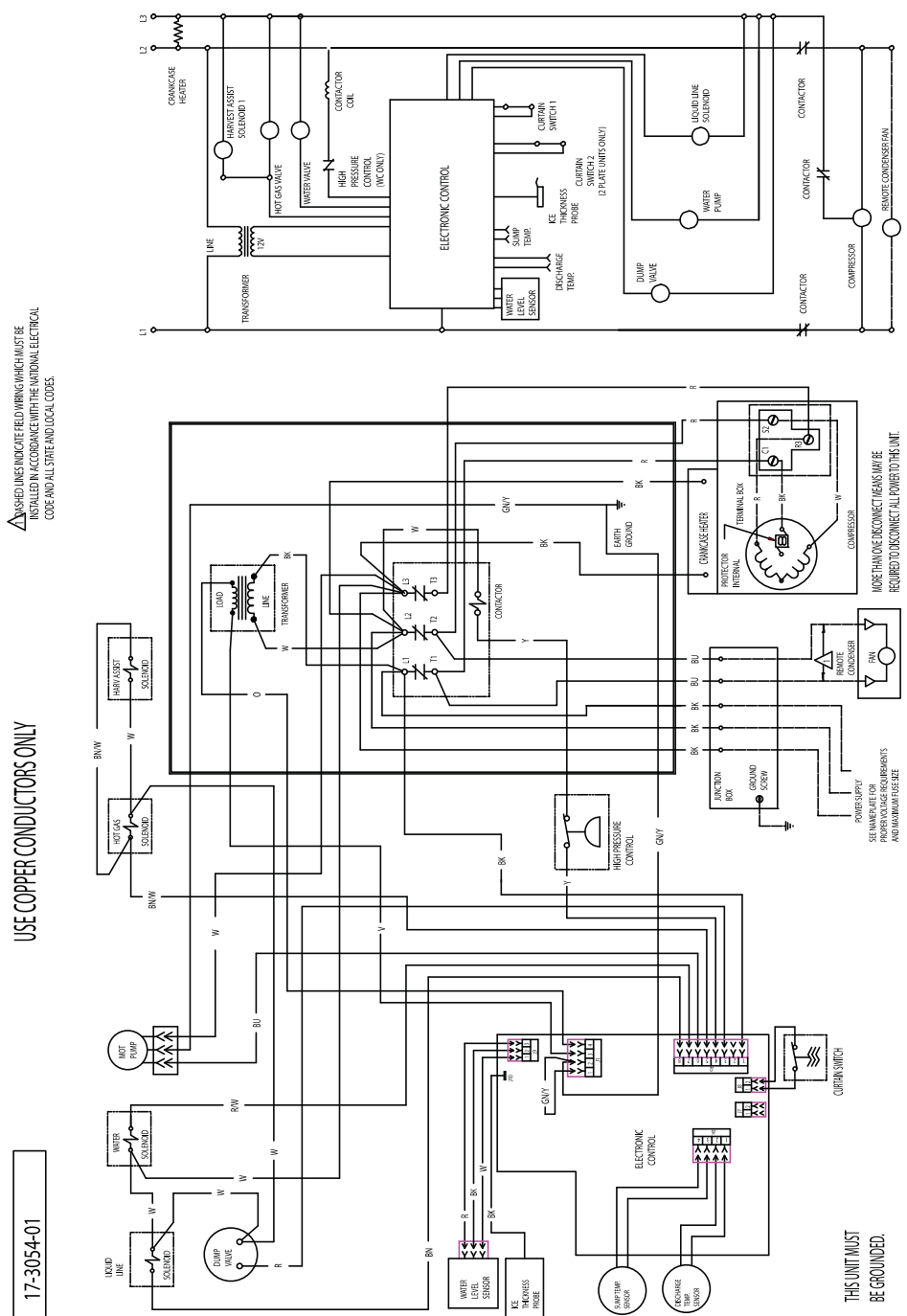
# Wiring Diagram

C0522R, C0530R, C0630R, C0830R, C1030R Single Phase after 9/09



# Wiring Diagram

C0522R, C0530R, C0630R, C0830R, C1030R - Three Phase



UNSHED LINES INDICATE FIELD WIRING WHICH MUST BE INSTALLED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE AND ALL STATE AND LOCAL CODES.

USE COPPER CONDUCTORS ONLY

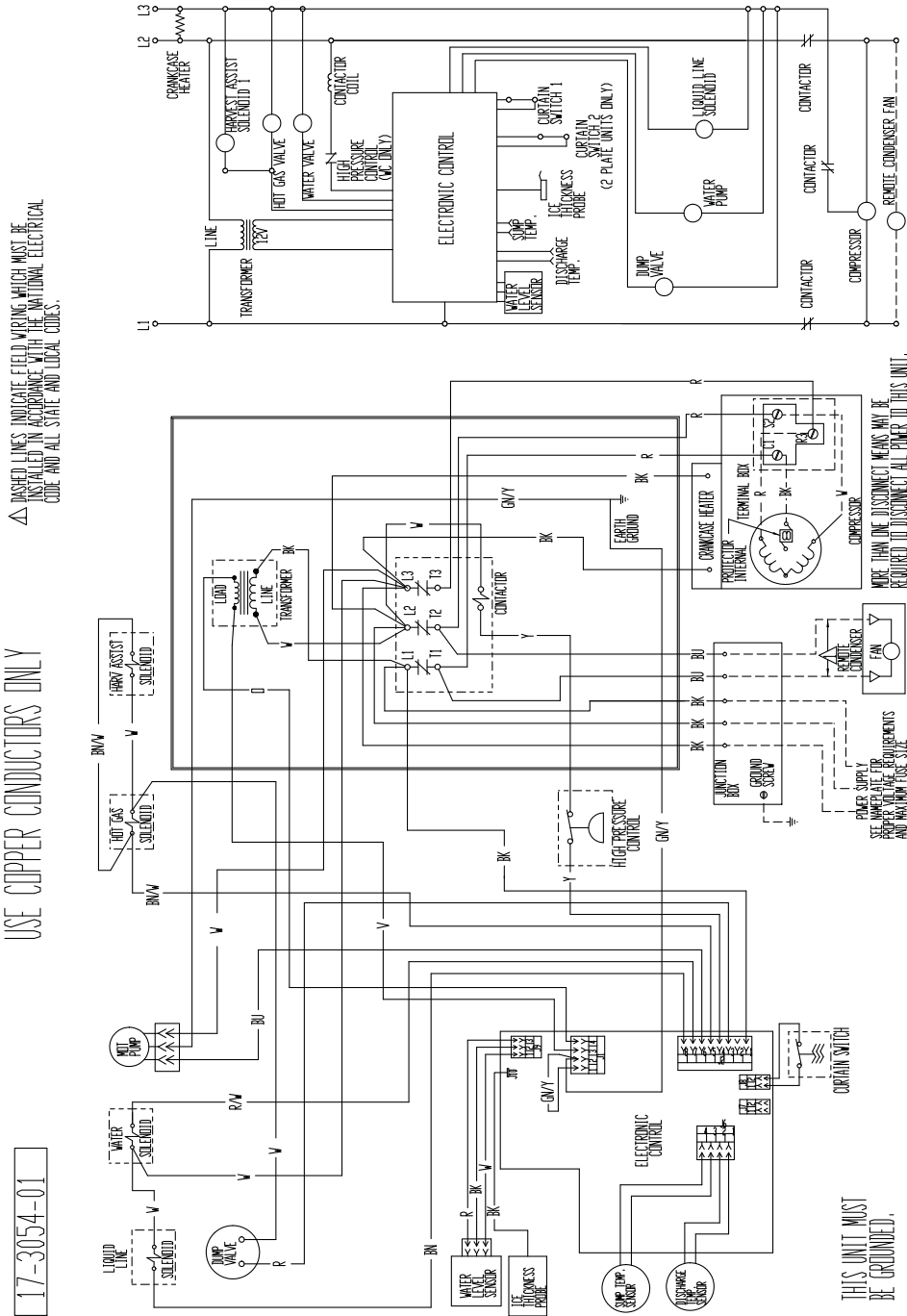
17-3054-01

THIS UNIT MUST BE GROUNDED.

MORE THAN ONE DISCONNECT MEANS MAY BE REQUIRED TO DISCONNECT ALL POWER TO THIS UNIT.

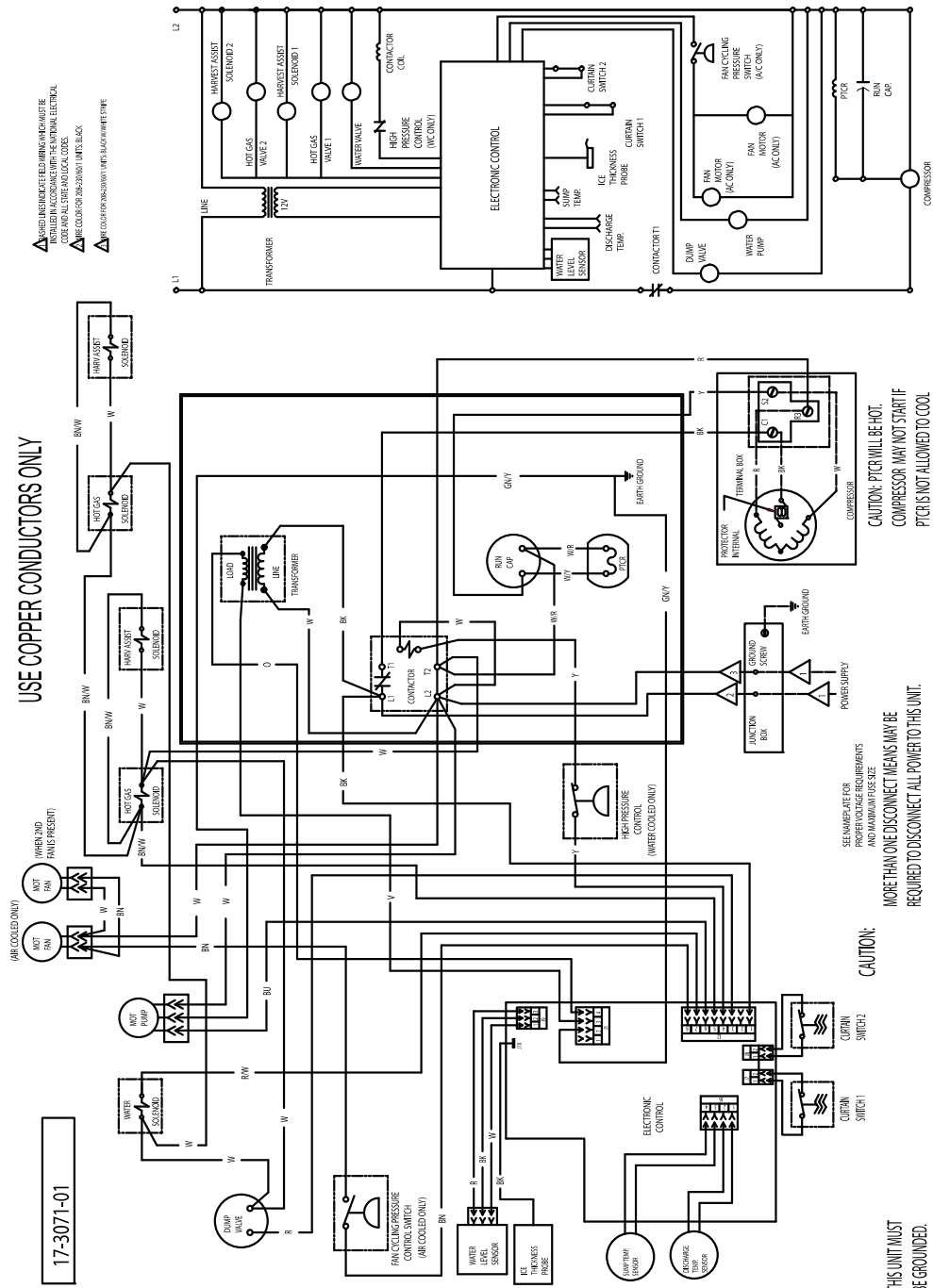
# Wiring Diagram

C0522R, C0530R, C0630R, C0830R, C1030R Three Phase after 9/09



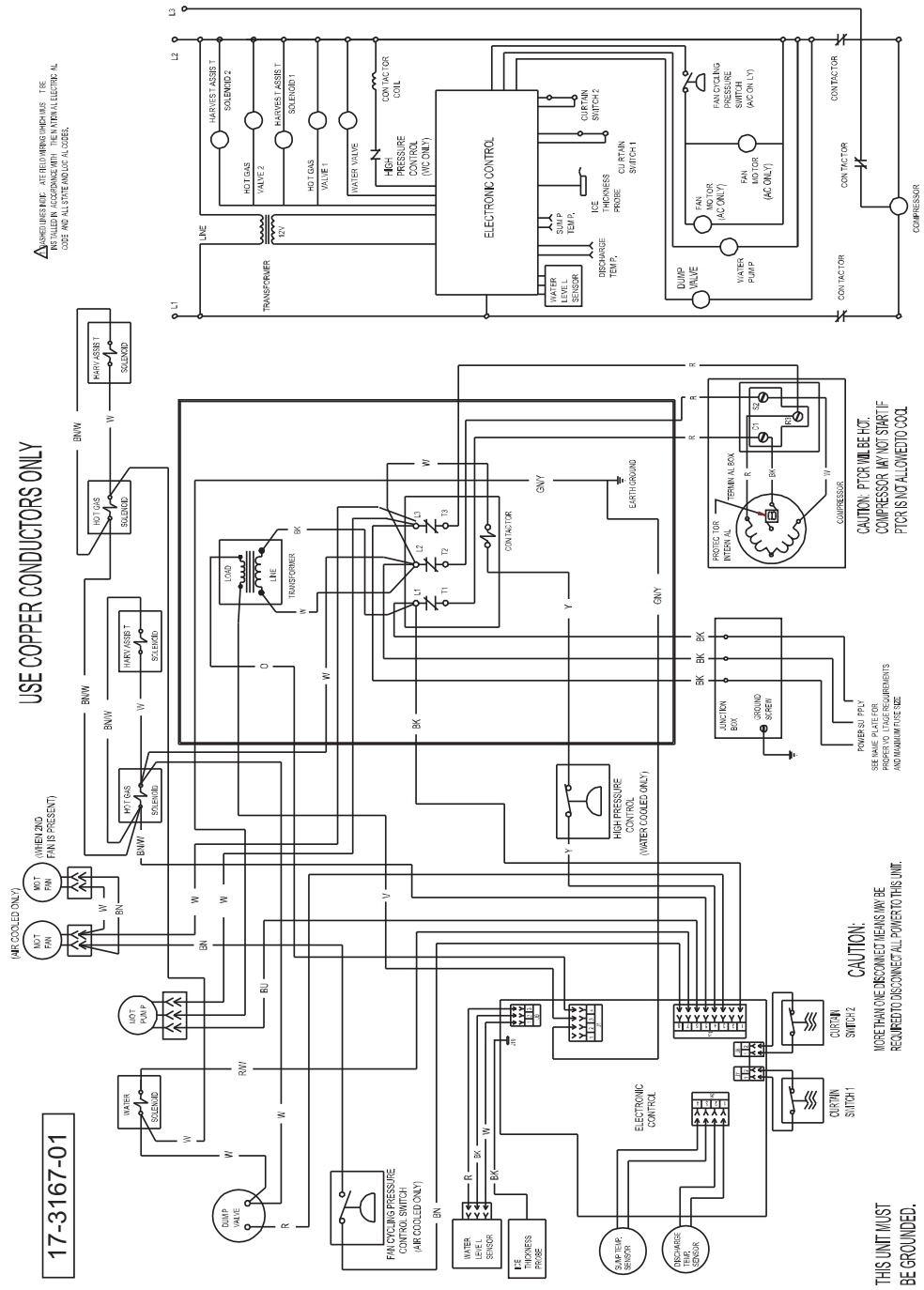
# Wiring Diagram

C1448, C1848, C2148 Single Phase



# Wiring Diagram

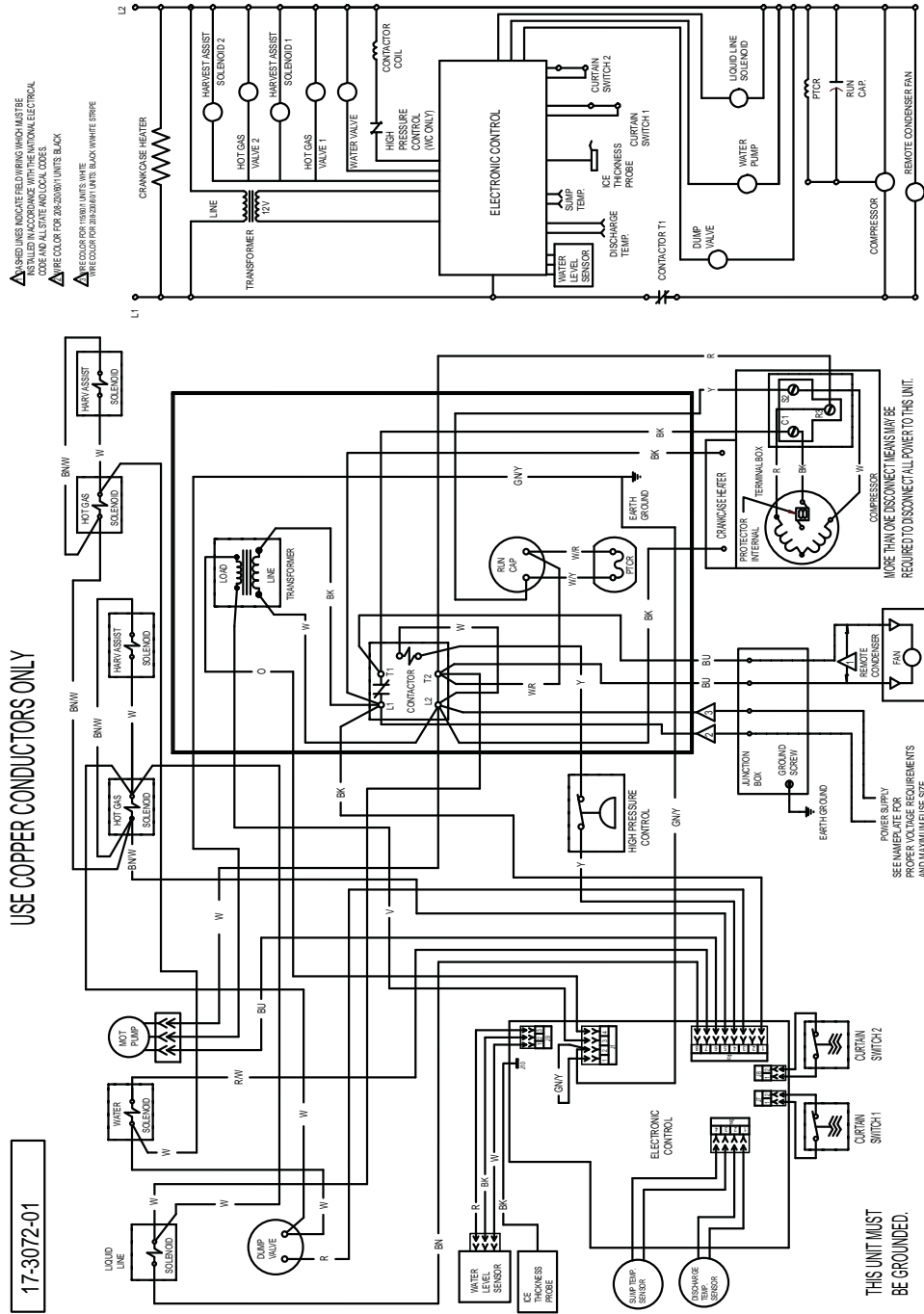
C1448, C1848, C2148 - three phase





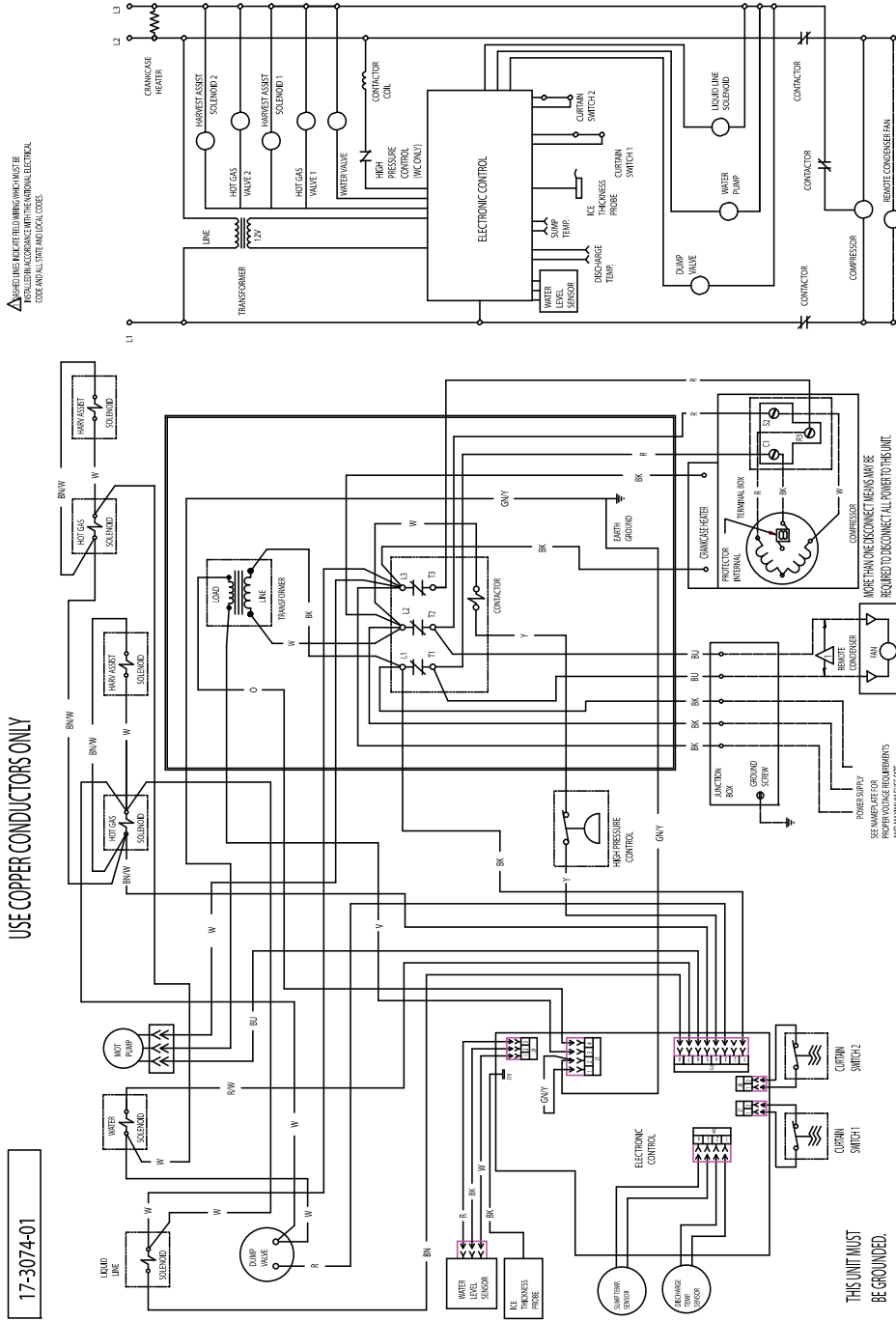
# Wiring Diagram

C1448R, C1848R, C2148R - single phase



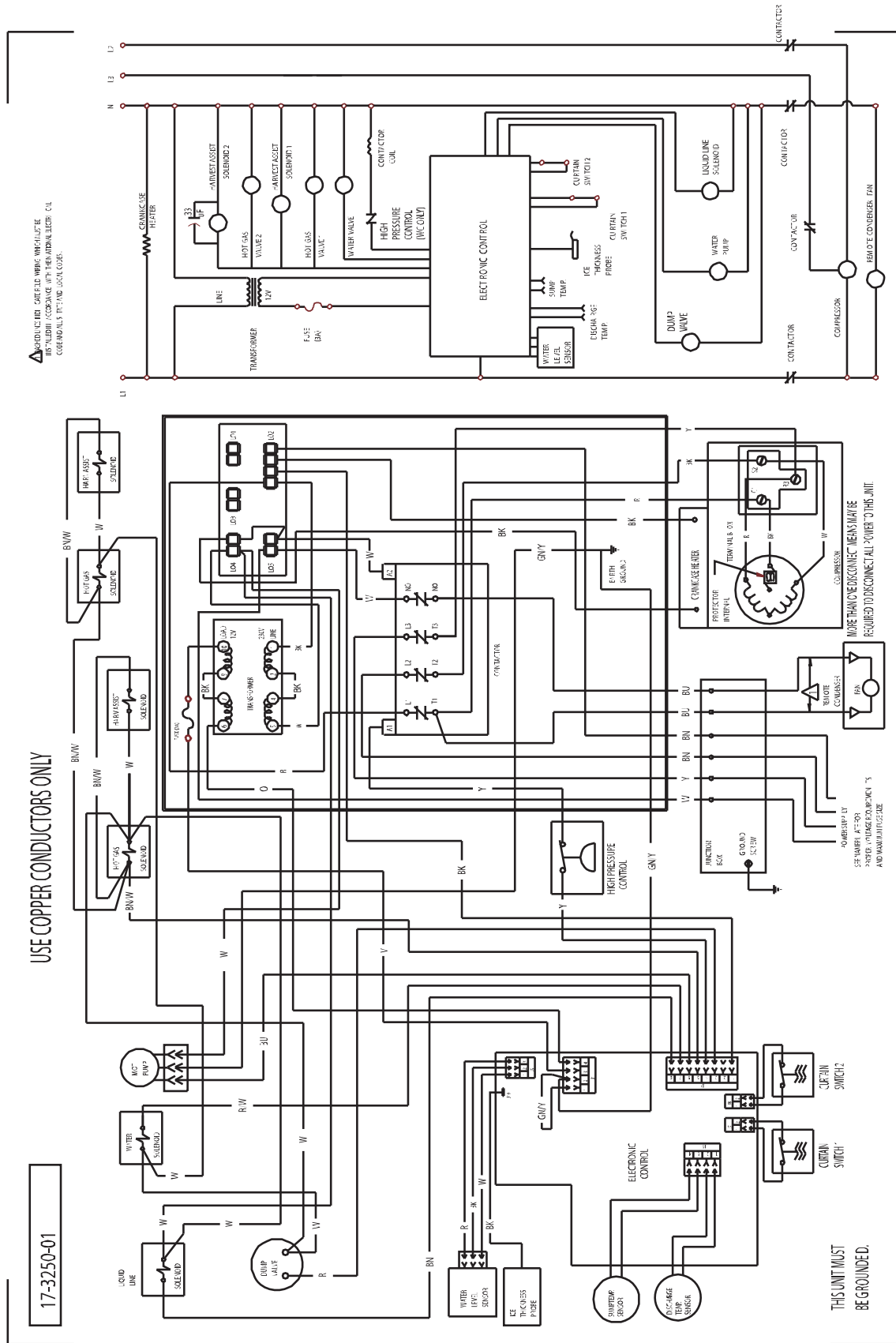
# Wiring Diagram

C1448R, C1848R, C2148R - three phase



# Wiring Diagram

C1448R-63 230/380-420/50/3

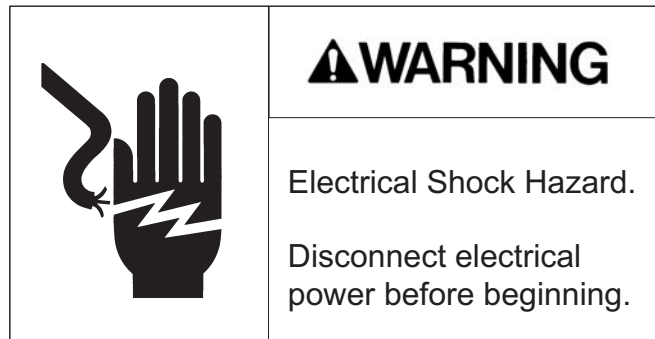


## Repair Procedures

---

### Inlet Water Solenoid Valve

- 1 Disconnect electrical power
- 2 Shut off the water supply.
- 3 Remove front and left side panels.
- 4 Unplug wire from coil.
- 5 Disconnect water supply tube from the inlet of the valve.
- 6 Disconnect the water outlet tube.
- 7 Remove the two mounting screws holding the valve to the back panel.
- 8 Pull the valve forward and out of the machine.




### Fan Blade or Motor

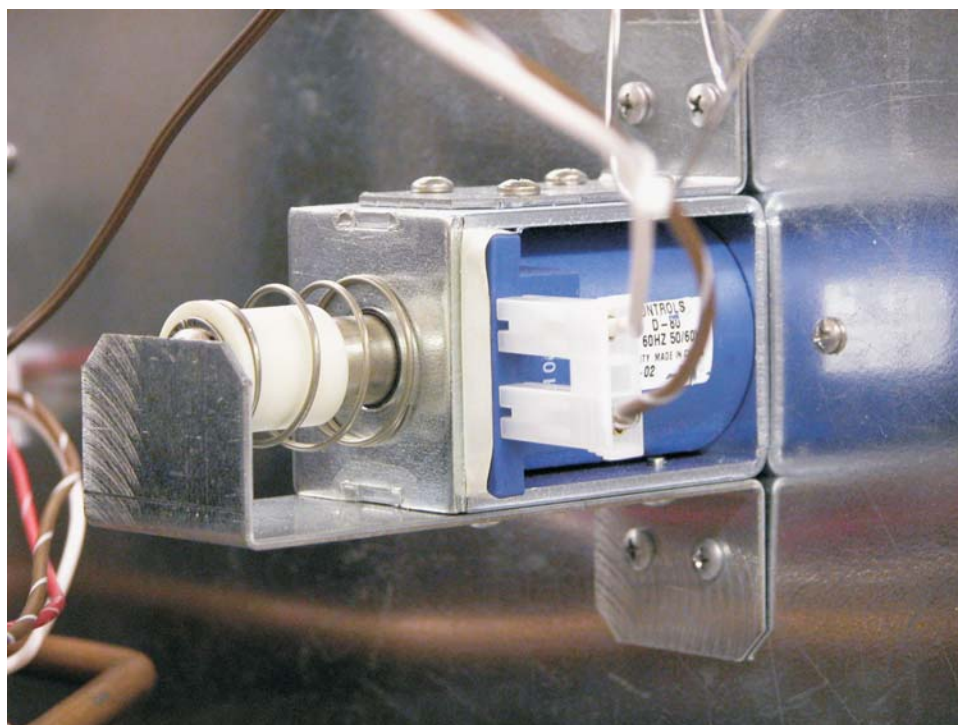
- 1 Push and release the Off button
- 2 Disconnect electrical power.
- 3 Remove front panel, sound shield and left side panel.
- 4 Unplug fan motor wire leads.
- 5 Remove fan motor mounting brackets from shroud. Note: Fastener size is 3/8" hex
- 6 Carefully remove fan motor and blade assembly from machine cabinet.
- 7 Loosen set screw, pull fan blade from motor shaft.
- 8 If the blade is the only part being changed, reverse to reassemble. Note: blade mounts purge to end of motor shaft.
- 9 If the motor will be changed, remove mounting brackets from fan motor. Note: Fastener size is 1/4" hex.
- 10 Reverse to reassemble.

## Harvest Assist Solenoid

- 1 Remove front panel.
- 2 Push and release Manual Harvest button
- 3 Disconnect electrical supply

	<b>⚠ WARNING</b>
	Electrical Shock Hazard. Disconnect electrical power before beginning.

- 4 Remove sound shield
- 5 Unplug wires from solenoid
- 6 Remove two screws and solenoid from cabinet
- 7 Reverse to reassemble.



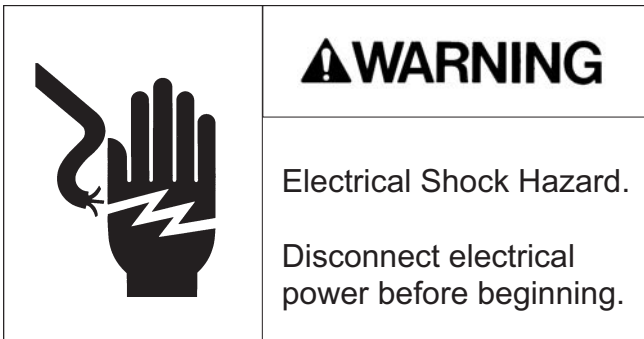
Harvest Assist Solenoid

## Repair Procedures

---

### Ice thickness sensor

- 1 Push and release the Off switch.
- 2 Remove front and top panels.
- 3 Push and release the Harvest switch
- 4 Remove the evaporator cover.
- 5 Remove the sound shield.
- 6 Disconnect electrical power.



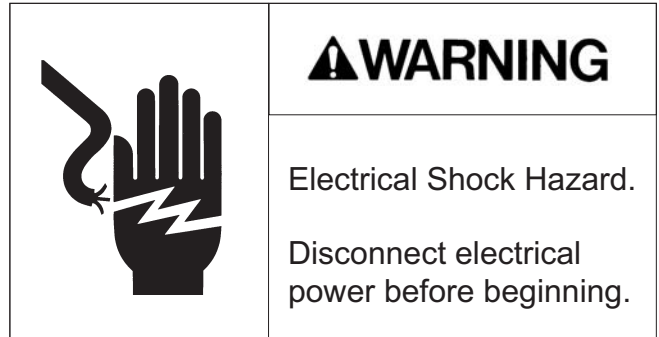
- 7 Open the control box.
- 8 Remove curtain.
- 9 Locate sensor, squeeze mounting legs together to release it from the mounting bracket.
- 10 Remove sensor, follow wire back to control box.
- 11 Disconnect from controller connection J10.
- 12 Remove sensor from machine.
- 13 Reverse to reassemble.
- 14 Set initial probe-to-evaporator-surface gap using a 7/32" drill bit as a gauge.

## Repair Procedures

---

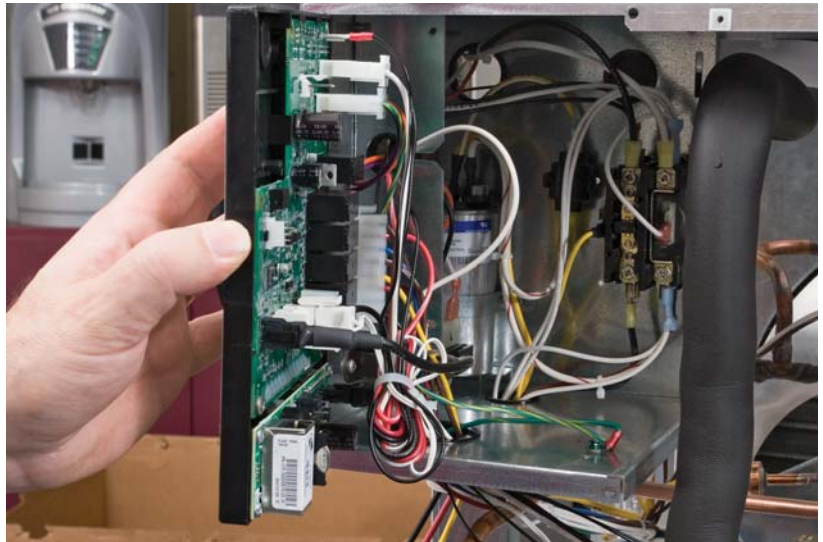
### Capacitor (run)

- 1 Disconnect electrical power.
- 2 Remove front panel.
- 3 Open control box cover.
- 4 Remove right side of control box.
- 5 Remove metal barrier from control box
- 6 Remove screw holding strap to back of the control box.
- 7 Remove wires from capacitor
- 8 Connect wires to new capacitor, refer to wiring diagram as needed.
- 9 Reverse to reassemble.



### Contactor


- 1 Disconnect electrical power.
- 2 Remove front panel.
- 3 Open control box cover.
- 4 Remove right side of control box.
- 5 Remove metal barrier from control box
- 6 Remove mounting screws holding contactor to control box.
- 7 Exchange wires from old controller to new. Refer to wiring diagram as needed.
- 8 Reverse to reassemble.



# Repair Procedures

## Controller

- 1 Disconnect electrical power.

	<b>⚠ WARNING</b>
	Electrical Shock Hazard. Disconnect electrical power before beginning.



- 2 Remove front panel.
- 3 Open control box door.
- 4 Unplug all wires from controller.
- 5 Remove screws holding controller to door
- 6 Push controller snaps down and pull controller from mounting bracket.
- 7 Before touching new controller, discharge any static electricity by touching the metal surface of the ice machine cabinet.
- 8 Rotate selector switch to the proper model number for the machine the controller is being installed on.
- 9 Install new controller on mounting bracket, secure with original screws.
- 10 Attach all wires removed.
- 11 Shut control box cover.
- 12 Switch on the electrical power.



Controller's Model Selector Switch



## Repair Procedures

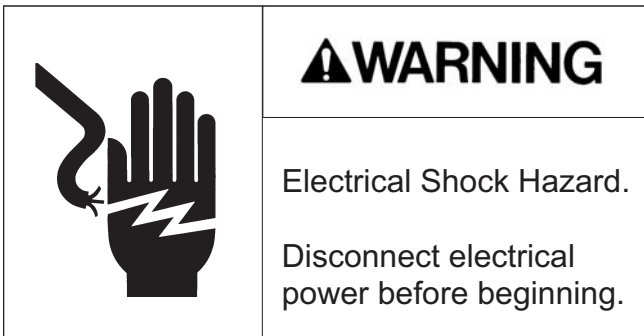
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### Curtain

- 1 Push and hold the Off button to shut the machine off.
- 2 Remove front panel.
- 3 Remove evaporator cover.
- 4 Push inside tab in to release front curtain pin from holder.
- 5 Pull curtain from machine.
- 6 Reverse to reassemble.
- 7 Push and release the ON button to restart the machine.

### Curtain switch

- 1 Push and hold the Off button to shut the machine off.
- 2 Disconnect electrical power

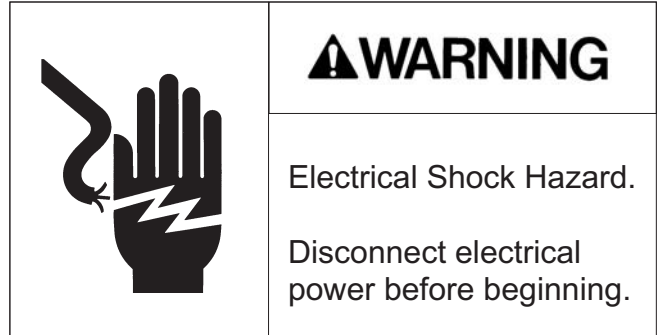


- 3 Remove front panel.
- 4 Remove evaporator cover.
- 5 Remove sound shield
- 6 Open control box.
- 7 Locate curtain switch on evaporator mounting bracket. Pull switch from its snaps.
- 8 Dismount wires from sump cover and remove from J7 or J8 connector on control board.
- 9 Reverse to reassemble. Be sure wires are re-mounted to sump cover edge.

## Repair Procedures

### Purge valve

- 1 Push and hold the Off button to shut the machine off.
- 2 Disconnect electrical power.
- 3 Remove front panel.
- 4 Remove left side panel.
- 5 Unplug wires from valve coil.



Note: The coil can be removed from the valve body by rotating it 1/8 turn CW. After removal of the coil the spring and plunger can be taken out.

- 6 Remove screws holding valve to mounting bracket.
- 7 Remove inlet and outlet hoses
- 8 Remove valve from cabinet.
- 9 Reverse to reassemble
- 1 Push and release the On button to restart the machine



### Water level sensor


- 1 Push and hold the Off button until the machine shuts off.
- 2 Remove the front panel.
- 3 Remove the sound shield.
- 4 Locate water level sensor.
- 5 Squeeze the locking tabs together and pull the sensor up and out of the sump.
- 6 Unplug the electrical connection from the sensor.
- 7 Reverse to reassemble.



# Repair Procedures

## Water pump

- 1 Push and hold the Off button until the machine shuts off.

	<b>⚠ WARNING</b>
	Electrical Shock Hazard. Disconnect electrical power before beginning.

- 2 Remove the front panel.
- 3 Remove the sound shield.
- 4 Unplug the water pump
- 5 Rotate the pump CCW about 1/8 turn to release it.
- 6 Lift pump up and remove hose
- 7 Attach hose to new pump
- 8 Install in pump bracket.
- 9 Rotate CW about 1/8 turn to lock it in place.
- 10 Plug pump into harness
- 11 Return panels to their original positions and secure with the original screws.
- 12 Push and release the ON button to restart the machine.

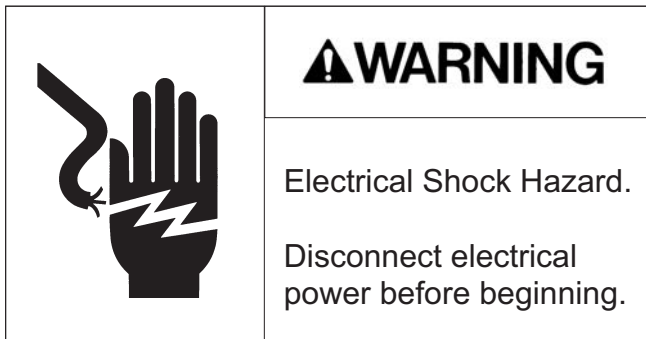


# Refrigeration Removal and Replacement Procedures

---

## Evaporator

- 1 Remove front panel.
- 2 Remove evaporator cover.
- 3 Remove right side panel.
- 4 Remove top panel.
- 5 If the machine was in operation, push and release the Harvest button to warm up the evaporator.
- 6 Disconnect electrical power.



- 7 Remove harvest assist solenoid
- 8 Recover refrigerant.
- 9 Remove curtain
- 10 Remove water distributor
- 11 Release ice thickness sensor
- 12 Remove water distributor bracket from the top of the evaporator
- 13 Connect nitrogen bottle to discharge access port. Open both access valves.
- 14 Open nitrogen valve
- 15 Unsweat the inlet and outlet refrigerant tubes. Use caution when heating the tubing, do not damage the freezing compartment walls.
- 16 Shut nitrogen valve.

## Refrigeration Removal and Replacement Procedures

---

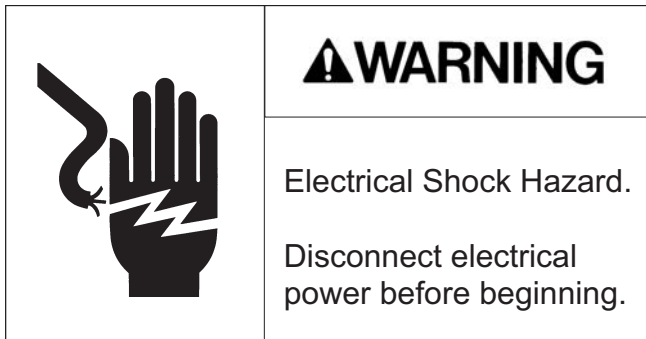
- 17 Gain access to the right side of the unit. Remove mounting screws holding the evaporator to the freezing compartment wall. Note: fastener size is 5/16" hex.
- 18 Remove the evaporator from the ice machine.
- 19 Attach new evaporator to freezing compartment wall, but do not secure tightly at this time.
- 20 Install the harvest assist solenoid. Note location of ejector pin. Adjust position of the evaporator slightly to center the pin in the guide hole of the evaporator. When centered, tighten all evaporator fasteners.
- 21 Open nitrogen valve
- 22 Reconnect inlet and outlet tubes by brazing the copper tubes together.
- 23 Replace filter drier.
- 24 Shut access valves, remove nitrogen bottle.
- 25 Evacuate to at least 300 microns.
- 26 Weigh in the nameplate charge. Check for leaks.
- 27 Return ice thickness sensor bracket, ice thickness sensor, water distributor, curtain and evaporator cover to their original positions.
- 28 Reconnect electrical power.
- 29 Return sound shield and front panel to their original positions.

# Refrigeration Removal and Replacement Procedures

---

## Compressor

- 1 Remove front panel.
- 2 Remove sound shield
- 3 If the machine was in operation, push and release the Harvest button to shut it down. Wait until the harvest cycle has ended so the evaporator has no ice on it.
- 4 Open the replacement compressor box. Check the compressor nameplate, be SURE that the replacement compressor is the correct one for the unit.
- 5 Disconnect electrical power.



- 6 Recover refrigerant.
- 7 Remove compressor terminal cover and disconnect electrical leads.
- 8 Remove all the mounting bolts.
- 9 Open both discharge and suction access valves
- 10 Connect nitrogen to discharge access valve.
- 11 Open nitrogen valve.
- 12 Unsweat the suction, discharge and process tubes.
- 13 Unsweat the drier from the liquid line. Remove it.
- 14 Shut the nitrogen valve.
- 15 Remove the compressor from the ice machine. Note: Some models may require the control box to be moved slightly to allow compressor replacement.
- 16 Immediately place new compressor in ice machine.

## Refrigeration Removal and Replacement Procedures

---

- 17 Open nitrogen bottle and braze compressor suction, discharge and process joints together. Braze new drier into system.
- 18 Shut off nitrogen, shut access valves.
- 19 Evacuate to at least 300 microns.
- 20 Replace PTCR and run capacitor.
- 21 Weigh in the nameplate charge. Check for leaks.
- 22 Reconnect electrical leads.
- 23 Attach compressor terminal cover.
- 24 Reconnect electrical power.
- 25 Return sound shield and front panel to their original positions.

---

Note: If the compressor is being returned for warranty, braze the stubs shut and tag the compressor with the required information.

---

# Refrigeration Removal and Replacement Procedures

---

## Thermostatic Expansion Valve

- 1 Remove front panel.
- 2 Remove sound shield (when used)
- 3 If the machine was in operation, push and release the Harvest button to shut it down. Wait until the harvest cycle has ended so the evaporator has no ice on it.
- 4 Disconnect electrical power.
- 5 Recover refrigerant.
- 6 Remove insulation covering expansion valve and bulb.
- 7 Remove strap securing bulb to suction line.
- 8 Open both discharge and suction access valves
- 9 Unsweat the expansion valve from the liquid line. Remove it.
- 10 Unsweat the drier from the liquid line. Remove it.
- 11 Connect nitrogen to discharge access valve.
- 12 Immediately place new valve in ice machine.
- 13 Open nitrogen bottle and braze expansion valve inlet and outlet joints together. Braze new drier into system.
- 14 Shut off nitrogen, shut access valves.
- 15 Evacuate to at least 300 microns.
- 16 Weigh in the nameplate charge. Check for leaks.
- 17 Attach bulb to suction line. Position at 4 or 8 o'clock on the tube. Secure tightly but do not crush the bulb with the strap.
- 18 Attach valve and bulb insulation.
- 19 Reconnect electrical power.
- 20 Return sound shield and front panel to their original positions.



## Optional add-on control information

### Vari-Smart™ Adjustable ice level option

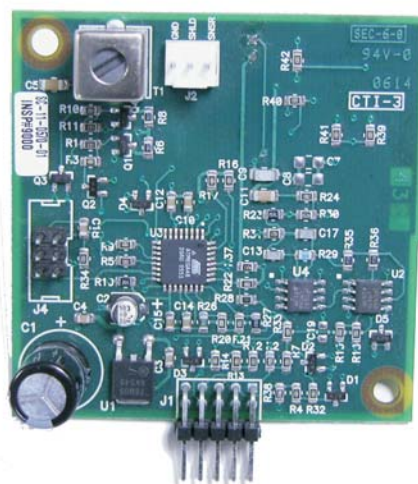
The adjustable ice level control is an optional add-on system consisting of an control board, label and sensor.

The control board fits above the standard control and connects to it using connector J4. The sensor mounts to the base of the ice machine through a hole in the base.

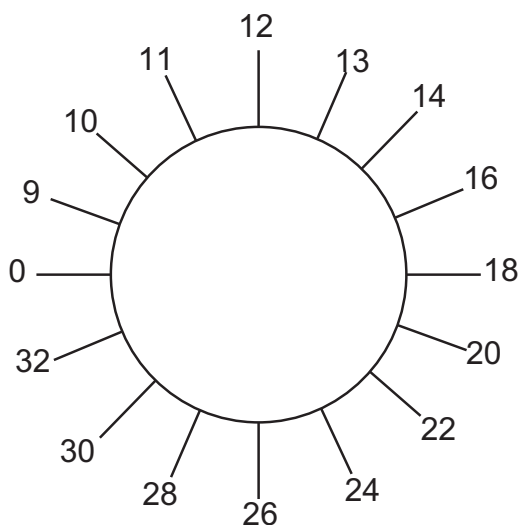
The control has an adjustment knob. Rotating the knob CW lowers the maximum ice level that the ice machine will maintain in the bin or dispenser. When the ice level is at or above maximum for the setting, the bin full light on the ultrasonic board will be ON.



Ultrasonic Board and Cable



Back View of Ultrasonic Board



Ultrasonic ice level control settings

0 = controlled by the curtain switch



Ultrasonic control shown in its installed position, set at maximum fill.

## **Adjustable Ice Level System Information and Diagnosis**

The ultrasonic sensor in the base of the ice machine is located to take advantage of the natural slope of the ice as it builds up in the bin. The numbers of the settings are from the sensor to the top of the ice pile directly under the sensor.

If the Vari-Smart system fails to shut off the machine and ice overfills the bin or dispenser, the curtain switch in the machine will switch the machine off, and will also restart the machine when ice is removed.

---

Note: Additional information on this option is included with the instructions provided with it.

---

## Prodigy's Smart-Board™ - an Advanced Feature Control

An optional control is available that can provide users with more features. It is available either as a field installed option or as a data-logger that can be used by the service technician.

The kit number for the add on option is: KSBU

The kit number for the data logger version is: TPDL1 or TPDL2

The Smart-Board can be applied to most Prodigy models. It can be used:

- With the standard controller
- With the standard controller and the SmartLock device (KSL)
- With the standard controller and the Vari-Smart™ Ice Level Control (KVS)
- With the standard controller, and both the KSL and the KVS

Smart-Board abilities include:

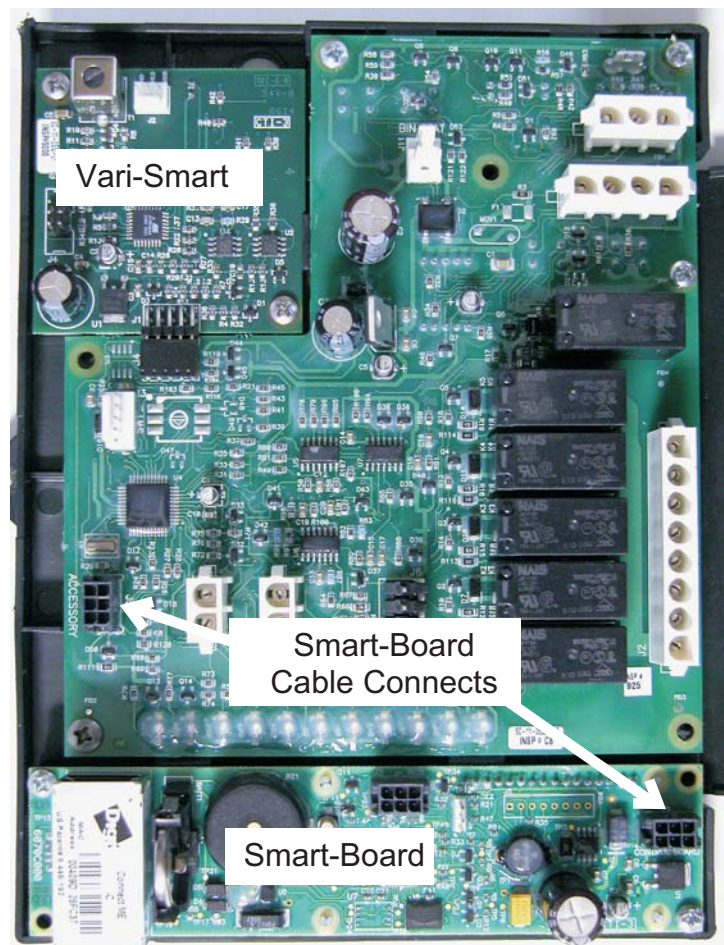
- Ethernet connection
- USB connection to be used with Scotsman's Prodigy TechTool software
- Data Logging
- Data Display

The Smart-Board mounts to the control box door just below the main controller. The cable connecting the two routes from the main controller Accessory connector to J1 of the Smart-Board.

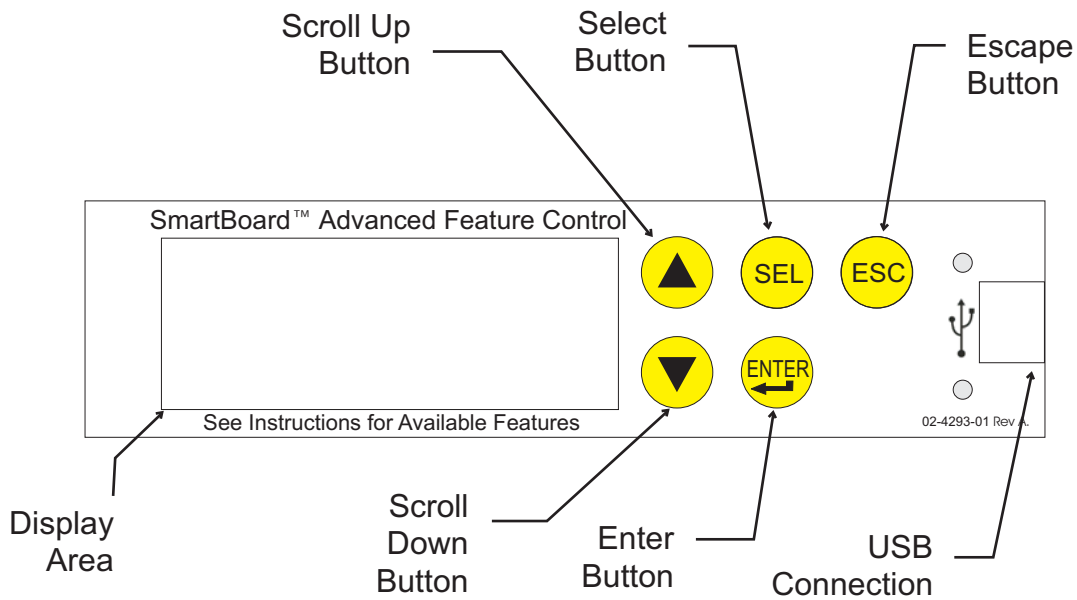
If the datalogger version is used, it plugs into the Accessory connector of the main controller.

If a SmartLock device is also connected, the SmartLock cable must be moved from the Accessory connector to the RLO connector of the SmartBoard.

Features and use instructions are included with either the KSB or the TPDL1.



Back of Controller, with SmartBoard and Vari-Smart Options installed.



**Scroll Up:** Changes the display to a menu item higher on the menu list or goes up one number on a setting

**Scroll Down:** Changes the display to a menu item lower on the menu list or goes down one number on a setting

**Select Button:** Use to make changes to settings.

**Enter Button:** Changes display to a sub menu list.

**Escape Button:** Changes display to the main menu.

The SmartBoard can display Alerts and Data.

Alerts:

- Service ice machine soon
- Slow water fill
- Long freeze cycle
- Long harvest cycle
- High discharge temperature

---

Note: Additional information on this option is included with the instructions provided with it.

## **Remote SmartLock (KSL)**

The remote lock out feature can be added to any controller. The feature allows someone, using a special paging service and code to control the on and off operation of that ice machine.

When a controller is locked out, the machine will finish a cycle and then stop. Switching the power off and on, pushing any amount or combination of switches will not restart the machine. It can only restart when it receives a clear signal from the remote lockout board.

The remote lock out consists of an antenna and cable. The antenna must be mounted onto the back of the ice machine cabinet. Two holes are provided for mounting. The connecting cable routes from the antenna through a hole in the back panel into the bottom of the control box.

Connect the antenna to the Accessory connector on the main board, or, if a SmartBoard has been installed on the machine, onto the RLO connector of the SmartBoard.

Due to the sensitive nature of this option, further information will only be supplied to registered users of a SmartLock device.

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Water Level Sensor . . . . . 33

Water Level Sensor: . . . . . 36

Water Pump . . . . . 32

Water Purge . . . . . 3

Water purge setting. . . . . 8

Water temperature sensor. . . . . 33

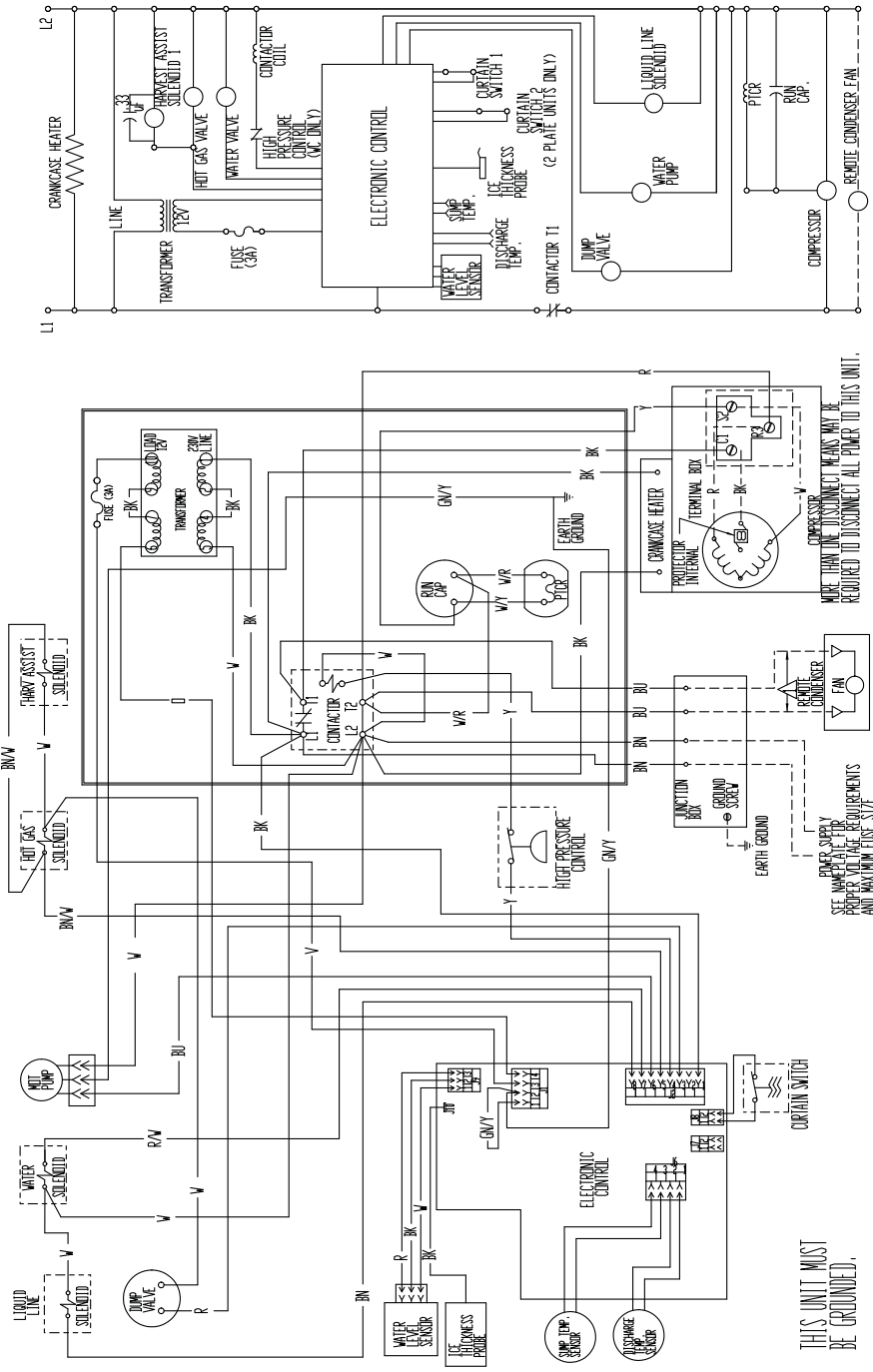
# Wiring Diagram

C0630R-6, C0830R-6, C1030R-6

△ DASHED LINES INDICATE FIELD WIRING, WHICH MUST BE INSTALLED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE AND ALL STATE AND LOCAL CODES.

USE COPPER CONDUCTORS ONLY

17-3178-01



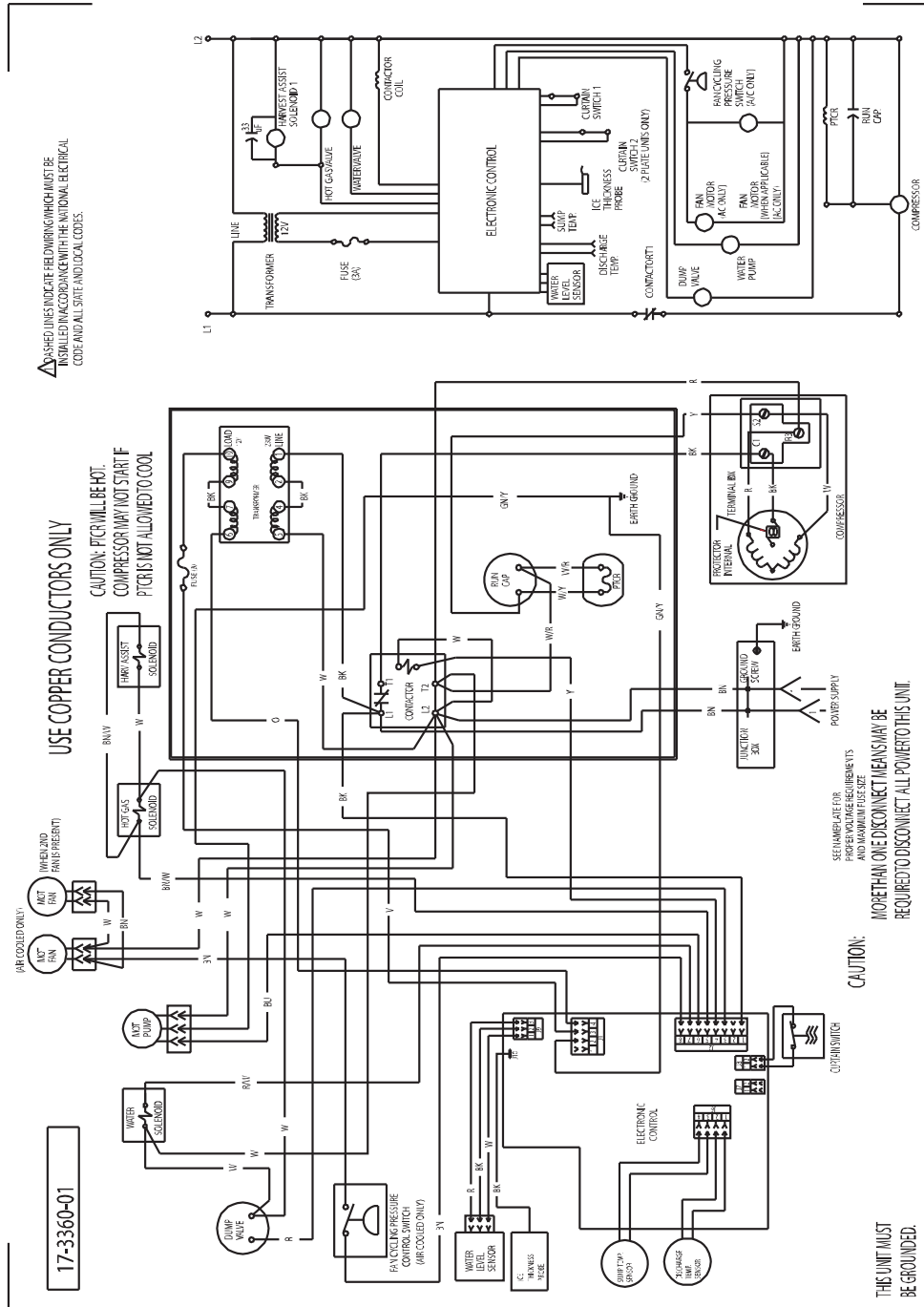
THIS UNIT MUST BE GROUNDING.

POWER SUPPLY PROPER VOLTAGE AND MAINTAIN FUSE SIZE  
 MORE THAN LINE DISCONNECT MEANS MAY BE REQUIRED TO DISCONNECT ALL POWER TO THIS UNIT.



# Wiring Diagram

C0530C 50 Hz



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